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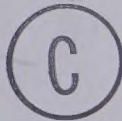


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THE UNIVERSITY OF ALBERTA

A STUDY OF THE RELATIONSHIP BETWEEN LEVEL
OF LINGUISTIC COMPETENCE AND READING ACHIEVEMENT

BY



DORIS MAE HOPKINS

A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "A Study of the Relationship Between Level of Linguistic Competence and Reading Achievement," submitted by Doris Mae Hopkins in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

This study attempted to assess the relationship between the linguistic competence which school beginners bring to reading and their success in learning to read. Linguistic competence was defined as the extent of the child's control over the phonological, morphological, and syntactical systems of English. The Templin Test of Articulation, the Berko Test of Morphology, and the Brown and Berko Test of Syntax were used to measure the linguistic competence of thirty-five Grade I children in September, 1965. Information on the selected contributing variables, sex, age, mental age, family position, preschool attendance, and socio-economic status, was obtained at the same time. Reading achievement of the sample was measured in May, 1966, using the Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word Recognition), Form 1. Scores on the reading sub-tests were totalled to obtain a total reading score for each subject; the three linguistic sub-test scores were treated similarly to obtain a total language score.

Appropriate statistical procedures were applied to the data. Means and standard deviations were calculated for all test scores. Pearson Product Moment Coefficients of Correlation were obtained to determine the linear relationship which existed between contributing and criterion variables. A Stepwise Multiple Linear Regression analysis was made to determine the relative contributions of each of the three language sub-test scores and the total language scores to the paragraph reading scores, the word recognition scores, and the total reading scores. Also, multiple regression equations were obtained for each of the contributing

variables on each of the language sub-test scores, the total language scores, and the total reading scores.

Analysis of variance indicated that, with wide variation, adult control over the morphology and syntax of English was far from attained for this sample. Near-adult control was demonstrated for phonology, however. Indications that linguistic competence is positively related to success in beginning reading were discovered in the significant positive correlations between the scores on the Berko Test of Morphology and all measures of reading achievement, and also between the total language and word recognition scores. Morphology scores were found to make a significant contribution to the word recognition, paragraph reading, and total reading equations. Evidence of sex differences favoring girls in reading achievement and boys in syntactical competence was obtained. Mental age was found to correlate significantly with reading achievement but not with linguistic competence. High socio-economic status related positively with measures of morphological competence and word recognition, providing oblique evidence of the intimate way in which these two facets of the language arts are related.

The evidence of incomplete language development by age six years, when considered in conjunction with the high positive correlations obtained between linguistic competence and reading achievement, suggest that linguistic competence should be taken into consideration by teachers of school beginners before undertaking any reading instruction with them. Further research is recommended to determine whether the findings of this small exploratory study can be generalized to the population at large.

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CHAPTER I

THE PROBLEM

The role of language in reading has been the subject of intense investigation in recent years (Loban, 1963; Ruddell, 1965; Strickland, 1962). As the developmental nature of language acquisition has become more clearly understood, educators have become increasingly aware of the dangers of assuming that adequate language ability exists for all children by age six and of the need for reliable methods of measuring language maturity has become paramount.

Fortunately, the linguistic scientists, through their investigations into the nature of language itself, have provided educational researchers with the means of measuring levels of language development with a precision and clarity never before possible.

The present study is an attempt to use certain of these linguistic measures to assess the language facility of beginning first graders. Specifically, this study will determine the relationship between a measure of linguistic competence on entering first grade and a measure of success in beginning reading.

Humans, being social animals, need to communicate with each other. Language is the unique system of sounds which they have developed for this purpose. Initially, language was oral, with speaking and listening being the only language arts. Later, as man felt the need to communicate not only at first hand but also through time and space, a companion system of orthography was developed and reading and writing were added to the skills required for effective communication.

The transmission of these systems of communication from one generation to the next has become one of society's most important educational tasks. The school, as our chief agency of education, has definite responsibilities in this regard and only through clear understanding of the nature of language and its development in the young can the school fulfill this vital function. There is widespread concern among educators that the language programs offered by the schools today do not reflect the increased understanding of language gained from the recent work of the linguistic sciences and of developmental psychology and are, therefore, less effective than they might be. Petty (1967) voices this concern thus:

The primacy of oral over written language in communication is talked about, and generally proclaimed. It is a primacy that no one seems to question. Yet, in spite of this recognition, and regardless of the urging of leading educators over the past thirty years, the instructional emphasis in schools has not actually reflected this primacy. (p. 264)

The interrelatedness of the four communication skills -- speaking, listening, reading, and writing -- has been acknowledged by educators over the years (Dawson, 1954; Ruddell, 1967). However, the assumption has long been that, as the child begins to acquire his native language during his first year of life, he has developed adequate proficiency in speaking and listening by the time he is ready to start school. The school, therefore, has concentrated its efforts on teaching him to read and write. Recent linguistic theory and research findings have indicated the fallaciousness of this arrangement and many modern educators believe it to be one of the causes of much of the failure of today's school children to communicate effectively.

Wilt (1968) states:

....the writer as well as many educators and researchers believe that the best insurance for later success in reading and writing depends upon the facility children have in using and understanding their language. (p. 611)

One of the purposes of this present study is to gather empirical data on the ways in which children differ in levels of language maturity on entering first grade and to discover what relationships these differences may have to success in beginning reading.

I. THE BACKGROUND OF THE STUDY

The theoretical background for this research is derived from two areas of concern, namely the nature of language and its role in the reading process.

The Nature of Language

Linguists have established the primacy of oral language in the communication cycle, pointing out that the spoken word is a first-order abstraction of reality (Waetjen, 1962). The vocal symbol derives its meaning directly from objects and experiences in the speaker's environment, whereas the written symbol is a second-order abstraction deriving its meaning from the vocal symbol for which it stands. Further, the linguists have pointed out that written language can represent oral language only incompletely due to the absence of such supplementary meaning clues as intonation patterns and gestures (Lefevre, 1964). Thus the reader's ability to reconstruct the intended spoken meaning from the printed page is dependent upon his familiarity with the language which enables him to supply these missing features. It seems logical that for

normal children proficiency in oral language must be in advance of initial proficiency in reading and writing and it follows that the child who is more proficient in oral language ability prior to starting school should have the advantage over linguistically less proficient children in learning to read. There is considerable research evidence to support this claim, especially during the early grades in school. Mackintosh (1964) points out that both Strickland and Loban have reported that children with large vocabularies and high achievement in oral language in their kindergarten year continued to exceed other children in reading ability as they progressed through the elementary grades. It must be pointed out, however, that this relationship between language and reading tends to reverse during the upper grades in school. It seems that, once the ability to read has been acquired, reading contributes to language development by providing vicarious experiences which result in enlarged vocabularies and more mature sentence patterns. Also, in later years more difficult vocabulary and more complex language structures learned through reading may transfer to oral usage.

Formerly linguistic proficiency was very difficult to define and to measure with any degree of objectivity, mainly because the tests used were measures of the speaker's performance rather than of his competence with his native language. No sample of verbal output can indicate all that the speaker is capable of saying therefore any analysis of such language is limited by the linguistic competence which happened to be revealed in that particular sample. Further, as the measures used were performance measures, such as total number of words, number of different words, and sentence length, only comparisons in language performance

were possible.

Recently, however, linguists have provided educational researchers with the means of measuring a speaker's linguistic competence with great precision and clarity based on their definition of the term 'language'. To a linguist language is a human communications system which results from the operation of three sub-systems. These have been identified as a phonological system which comprises the sounds of the language and the rules by which they are combined into words; a morphological system of root words and derivatives which enables the speaker to convey changes in number, tense, and voice and to derive additional words by the use of affixes; and a syntactical system which governs the ordering of words in meaningful patterns producing the grammar of the language. Hence the speaker's linguistic competence is determined by the degree of control which he exhibits over these three sub-systems of his language.

Linguists have devised tests of each of these sub-systems which can provide an objective, quantitative measure of a speaker's proficiency in these competence aspects of his language. These tests usually involve the subject in a situation which is so structured that the linguistic element being studied is elicited in the response. While this method is also limited by the performance aspect, i.e. what the child chooses to utter at that point in time, it is nevertheless a promising method of obtaining information that is specific and reliable concerning the linguistic competence of a speaker.

It must be kept in mind that linguistic competence as here described does not constitute the whole of proficiency in language. Prosodic features contribute greatly to linguistic skill by enabling the

speaker to convey part of his meaning through stress, pitch, and juncture. Also, the important area of word meaning figures largely in the speaker's total language ability. The tests used in this study, unfortunately, do not measure either of these two last-mentioned aspects of language ability and the findings are limited thereby.

The Reading Process

The assumption that language is an integral part of the reading process is central to this thesis. This assumption is supported by a growing body of research evidence as well as by the opinions of experts in the field. Ruddell (1967), writing in the combined research report of five professional societies concerned with the language arts, says:

The research reviewed indicates that oral language development serves as the underlying base for the development of reading and writing achievement. The child's ability to comprehend written materials through reading and to express himself through written communication appears directly related to his maturity in the speaking and listening phases of language development. (p. 16)

Reading has been discussed at length in the professional literature. All discussions, however, stress that meaning must be derived from the printed page before real reading can occur. It is with this vital ingredient - meaning - that language enters the reading process.

Reading is considered a sensory and perceptual, as well as a conceptual-linguistic process. Before a child learns to read he must have attained certain visual capabilities. The eyes must have matured to the point where they can focus at distances of twenty inches or less and see clearly, singly, and for sustained periods the printed symbols on the page. They must be capable of learning to progress from left to right and from one line of print to the next. As

the beginning reader's eyes move along a line of print they fixate many times in recognizing each of the words. Buswell (1922) found that the average child in Grade I made between 15.5 and 18.6 fixations per 3-1/2 inch (21 pica) line. Slowly and laboriously the eyes transmit the images of the graphic symbols received on their retinas to the brain where they must be fused into words and converted into meaningful speech. These require sensory and perceptual skills.

In order to recognize a printed word the reader must not only be able to see the symbols and distinguish among minute differences in them but he must also remember what they stand for. This calls on his visual memory of word configurations which is developed through repeated exposures to the graphic symbol while hearing the appropriate verbal symbol. These visual configurations of words are stored in the brain as separate entities in the early 'sight vocabulary' stages of reading. Later, as the child learns phonics, the significance of the grapheme/phoneme relationship becomes clear to him and he is able to decode words he may not have previously encountered in print. His ability to learn this relationship is clearly dependent upon his prior knowledge of the unique sounds of English, i.e. the phonological system.

However, as the orthographic system of English contains so many irregular rules and exceptions, the reader must rely heavily on word attack skills other than phonics for assistance in recognizing printed words. Two such skills, structural analysis and context clues, draw directly on the reader's knowledge of the morphology and syntax of his language. For example, the ability to see the word 'jumping' as composed of the root 'jump' and the inflectional ending '-ing' assists the reader

only if he knows the rule for forming the present progressive in English. In like manner, his ability to ascertain that the word after 'The' is 'dog' in the sentence

The dog barks.

is derived in part from his grammatical knowledge of the word 'dog' as a member of the class of words which can occur in the slot, 'The _____ barks.' His previous experience with dogs as animals that bark would account for his selecting the particular word 'dog' to fill the slot. This selection would be verified by his visual perception of the initial consonant 'd' as that which symbolizes the phoneme /d/ with which 'dog' begins and which would serve to differentiate the word from 'seal', an animal which also barks. Word recognition, a major facet of the reading process can, therefore, be accounted for by the reader's visual-perceptual abilities, his competence in the phonology, morphology, and syntax of his language, as well as his knowledge of word meanings.

As the above discussion suggests, the meaning which a child is able to bring to his reading is determined partly by his background of experience and partly by his understanding of language. Words have both semantic and lexical meanings: the former obtained through experience with the objects and events in the real world for which they stand; the latter from the speaker's understanding of the grammar of his language. The basic function of grammar is as an aid to the expression and interpretation of meaning. Words do not give meaning to sentences; rather words receive much of their meaning from the verbal context of which they are a part. To illustrate, an examination of the following sentences

indicates the manner in which grammatical structure affects meaning;

The dog bit the man.

The man bit the dog.

Strickland (1960) stresses that reading is concerned with words, not as single units, but as they appear in sentences and notes that in order to understand fully meaning, the words must be thought together in meaningful patterns. Such understanding is derived from the child's ability to relate the words and sentences that he reads to one another. This is language ability. Thus, it may be said that it is partly the reader's linguistic competence which enables him to gain meaning from the printed page. To unlock the full meaning of a sentence or passage the reader must possess the necessary experience referred to in the context as well as the required linguistic proficiency.

It must be noted, in addition to the above, that part of the meaning of an utterance is conveyed by the prosody of the speaker. Such characteristics as stress, pitch, and juncture add to and develop the meaning intended. These features are largely missing in written language, being indicated only through punctuation marks, and the writer must depend heavily upon the reader's familiarity with the language to interpret what was written as he intended. This familiarity is part of the speaker's total competence with language.

To summarize the role of language in the reading process, the following quotation from Dechant (1964) seems appropriate:

The child's proficiency in reading, and certainly his word identification and recognition skill, is dependent upon his ability to articulate, enunciate, and pronounce the sounds met in his language.

Furthermore, genuine reading proficiency may mean the ability to read language structure. The best reader may be one mentally aware of the stresses, elongations of words, changes of pitch and intonation, and rhythms of the sentences he reads. If he reads what was spoken the way the writer would like it to have been said, true communication of meaning may be possible. (p. 114).

If reading is primarily a linguistic process, as is believed, then language ability must account for a major portion of reading ability. The remainder must be attributable to visual and auditory perception. Language ability has been described herein as a composite of linguistic competence and word meaning. Linguistic competence is seen as the speaker's control over the phonology, morphology, syntax, and prosody of his language. A measure of the child's linguistic competence before learning to read should therefore be a good predictor of his success in beginning reading, inasmuch as linguistic competence accounts for everything but the child's visual and auditory abilities and the richness and extent of his meaning vocabulary.

However, other factors are known to influence success in reading. Socio-economic status, for example, has consistently shown a high positive correlation to reading ability in countless research studies. A similar relationship has been shown to exist between socio-economic status and language ability suggesting that this important factor influences reading and language in the same way because of the close relationship of reading to language. In like manner, chronological age, mental age, sex, birth order, and parent/child interaction patterns have been found to influence both reading and language to a similar extent. It seems logical then, that in any attempts to equate reading and language the effects of these

contributing variables would tend to cancel each other out leaving only visual perception and word meaning to account for the variance between language and reading ability.

It is the intent of the present study to test the theory described above by measuring the linguistic competence of a group of school beginners using tests of phonology, morphology and syntax. These scores so obtained will be correlated with reading achievement scores earned by the same group at the end of Gr. I. Data on contributing variables will also be collected and correlated with both reading and language achievement. These data will be subjected to multiple regression analysis to ascertain the relative contributions of each of the criterion and contributing variables to reading achievement and to language competence.

II. DEFINITION OF TERMS

The following terms are used in this study to discuss the child's ability to communicate through language:

1. Linguistic Competence refers to the child's total ability as a native speaker of English as evidenced by the success with which he controls the phonology, morphology, and syntax of the language. These three sub-systems are defined as follows:

- a. Phonological Ability is the speaker's ability to produce the sounds of English and combine them into words, as defined for this study by his performance on the Templin Test of Articulation

- b. Morphological Ability is the speaker's ability to apply the rules for forming derivatives from the root words of English, as defined for this study by his performance on the Berko Test of Morphology.
- c. Syntactical Ability refers to the speaker's skill in ordering the words in his sentences so that they convey his meaning to those who listen, as defined for this study by his performance on the Brown and Berko Test of Syntax.

2. Level of Linguistic Competence: For the purposes of this study, level of linguistic competence is defined as the combined scores of a child on the Templin Test of Articulation, the Berko Test of Morphology, and the Brown and Berko Test of Syntax in September of his first year in school. The criterion for success in each of these abilities is its acceptability by an adult native speaker of English.

3. Reading Ability refers to the success with which the child is able to understand the contextual meaning of graphic symbols.

4. Level of Reading Achievement: For the purposes of this study, level of reading achievement of a child shall be defined as the total of his scores on the Gates Primary Reading Tests, Type PPR (Paragraph Meaning) and Type PWR (Word Recognition) in June of his Grade I year.

III. HYPOTHESES

To determine the relationship that exists between language and reading at the Grade I level, the following hypotheses were formulated:

Research Hypothesis

Children who have developed a greater competence in language before entering school will be more successful in learning to read in Grade I than will children who are linguistically less competent.

Null Hypotheses

The following operational null hypotheses corresponding to the research hypothesis were tested:

Hypothesis I. There is no significant relationship between the scores obtained by a group of children in June of their Grade I year on the Gates Primary Reading Tests, Type PPR (Paragraph Reading), and Type PWR (Word Recognition), for Grade I and Grade II (first half), and the scores obtained by the same children on entering Grade I the previous September on:

- a) The Templin Test of Articulation.
- b) The Berko Test of Morphology.
- c) The Brown and Berko Test of Syntax.

Hypothesis II. There is no significant relationship between the total language scores on the Linguistic Competence Test obtained by children in September of their Grade I year and the scores obtained by the same children in June of their Grade I year on The Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word Recognition), for Grade I and Grade II (first half).

Hypothesis III. There is no significant relationship between linguistic competence and certain aptitudes and characteristics assumed to be related to linguistic competence, as in the following:

- a) Sex.
- b) Chronological Age.
- c) Mental Age.
- d) Family Position.
- e) Preschool Attendance
- f) Socio-economic Status.

Hypothesis IV. There is no significant relationship between reading achievement and certain aptitudes and characteristics assumed to be related to reading achievement, as in the following:

- a) Sex.
- b) Chronological Age.
- c) Mental Age.
- d) Family Position.
- e) Preschool Attendance.
- f) Socio-economic Status.

IV. DELIMITATIONS OF THE STUDY

The following delimiting factors must be considered in evaluating the findings, implications, and conclusions of this study:

1. The three tests of linguistic competence used in this study are new, having been developed within the past ten years expressly for use in studies of the acquisition of language. It was necessary for this investigator to abridge the original tests somewhat in order

to keep within a reasonable time limit for young children, and this may have affected the validity of the tests.

2. The Brown and Berko Test of Syntax measures only one aspect of syntactical competence, namely the ability to derive meaning of an unknown word from its part-of-speech membership. This study is limited by the extent to which this ability is representative of a child's total syntactical competence.

3. Variations in the effectiveness of the reading instruction given in the two classrooms used in this study constitute a variable controlled only to the extent that each classroom used the same basal readers for instructional purposes, and that both teachers had equivalent training and experience.

V. SUMMARY

This chapter has presented a brief description of the present study in the relationship of linguistic competence and reading achievement among school beginners. The belief that such a relationship exists was presented in a discussion of the theory of reading as an integral part of the language process. The purpose of the study was given, terms defined, research and null hypotheses were stated and delimitations were pointed out.

The remaining chapters of this report are organized as follows:

Chapter II: A review of the related literature pertaining to this study.

Chapter III: A description of the pilot study, the sample, the testing instruments, the method of gathering the data, and the

statistical treatment of the data.

Chapter IV: An interpretation of the statistical analysis and discussion of the findings.

Chapter V: The summary, conclusions based on the findings, the implications for education, and suggestions for further research.

CHAPTER II

REVIEW OF RESEARCH

The relationship of language to reading has been the subject of limited research over the past thirty-five years and a moderate literature has developed. More extensive research has been carried out in the field of language development in children during the same period providing a substantial literature for the guidance of future investigators, while research into the reading process itself has been vast, resulting in a literature of unbelievable magnitude. All of the above-mentioned research is pertinent to this study, however only that which applies to the child at the first-grade level will be reviewed. Furthermore, research since 1950 will be stressed as it was at that time that the science of linguistics began to influence research into language development and, subsequently, into the reading process as well.

This chapter contains a review of recent research findings into the nature of language development in preschool children, interrelationships in oral language development and reading achievement, and the influence of sex, age, intelligence, socio-economic status, family position and preschool attendance on both the oral language development and the reading achievement of young children.

The Nature of Language Development in Children

Any attempt to measure and compare levels of language maturity must be founded on a clear and precise definition of language itself. With the advent of linguistic science has come a clearer understanding of the nature of language because of its emphasis on the description of

the structure of language in functional terms. A substantial body of research findings and techniques has emerged which can be used by the student of child language to measure linguistic maturity in terms of control over the various systems of language rather than in terms of language production, as was formerly the case.

The development of language in children has been studied for many years, not by educators so much as by psychologists interested in the process of language acquisition and development and the insights it might provide into the understanding of child behaviour. A vast literature of the subject has accrued. McCarthy (1954) has provided an excellent summary of the findings of earlier studies in this field. Unfortunately, these early studies provided only normative observational data on grosser aspects of language development, such as sentence length, vocabulary, and frequency of simple and complex sentences, which were imprecise, intuitive, and often misleading. Many of the investigators realized the short-comings of their linguistic measures and called, as did Templin (1957), for the development of techniques for language study which would bring out the qualitative, as well as the quantitative distinctions in child language.

Modern linguistics, according to the summary by Carroll (1953), defines language as a structured system of arbitrary sounds and sequences of sounds. Three sub-systems have been identified: the phonological, morphological and the syntactical. Research into the acquisition of language in children will be dealt with under these three headings.

Phonology. The phonological system is concerned with the unique sounds of a language called 'phonemes'. These are the 'building blocks'

of speech which enable the speaker to identify utterances as variant or invariant. Linguists have defined phonemes as the minimal sound units occurring in a language which make differences in meaning. It is generally agreed that there are approximately forty-two phonemes of Standard English.

The child begins to utter sounds within the first three months of life. Currently, the role babbling plays in the process of language development is being questioned. The traditional view has been that when a baby babbles he is learning to articulate the sounds that he will later use in his speech. Sander (1969) discusses the more current view, first advanced by Mowrer, that a child understands language long before he is able to produce it. His first 'babbles' are his earliest attempts at producing the words that he already understands. Therefore, according to Mowrer, babbling is not random meaningless vocalising as was hitherto believed, but is, in fact, language even though it is rarely understandable to adults. As the child's efforts are positively reinforced by his parents, he is motivated to produce more and more language and with practice and maturation his speech becomes more and more intelligible until, about age twelve months, he says his 'first words'.

Jakobson (1956) has proposed a theory of phonemic development which has been very influential. He views the acquisition of phonological contrasts in terms of learning to distinguish features or properties of sounds rather than classes. According to Jakobson the child uses a process of successive binary division to elaborate a phonological system approaching the adult. The process begins when the child can distinguish vowel sounds from consonant sounds, these being the most different of all the

differing sounds of English. Phonological development proceeds every time the child perceives a different feature of the language which enables him to classify a larger type of sound into two types on the basis of this newly-perceived characteristic. For example, becoming aware of the voiced-voiceless feature of consonants enables the child to double the number of sounds he was previously able to make. As the number of contrasting features is much smaller than the number of phonemes, this theory presents an economical explanation of the learning of a complex system of sounds. It is consistent with the observation that growth in the phonology of language seems to come in sudden spurts; the interval between the discovery of new features being irregular.

Several studies on the sequence of the acquisition of phonemes in young children have attempted to test Jakobson's theory. Those of Velten (1943) and Leopold (1954) are noteworthy, having yielded generalizations which support this theory of binary division of contrasting features. However, as Ervin and Miller (1963) point out, their findings must be viewed with extreme caution because of the small sample and restricted range of languages from which they are drawn. Templin (1957) has provided further evidence to support Jakobson's hypothesis from the findings of her study of articulatory problems of children. She found that the order in which the sounds of English appeared in her 240 subjects, ages three to eight years, coincided with the generalizations concerning the order of appearance of phonemic contrasts derived from the research of Velten. This order is indicated in Table I. Perhaps as this is derived from a much larger population, more importance can be attached to the findings.

TABLE I

SEQUENCE OF PHONOLOGICAL DEVELOPMENT

1. Diphthongs.

2. Vowels.

High precede low
 Front precede back.
 Oral precede nasal.

3. Consonants.

Nasals, voiceless precede voiced.
 Plosives, voiced precedes voiceless.
 Fricatives, voiced precedes voiceless.
 Combinations, voiceless precedes voiced.
 Semi-vowels, voiceless precedes voiced.

4. Double consonant blends.

5. Triple consonant blends.

6. Positional sequence:

Accuracy reached in initial and medial
 positions before in final position.

The phonological system is the one which is mastered first by the child in learning to speak. The majority of sounds are acquired by age six according to Snow (1963) who found 88.5 percent correct responses among the 60,000 she analysed in her investigation of the articulation ability of 433 'normal' first grade children. This supports the finding of Templin (1957) who obtained 90 percent correct responses by age six among the 60 first graders in her study.

The phonemes of a language can be combined into morphemes and ultimately into words only according to certain very specific rules or conventions. This constitutes another aspect of the phonological system which the child must learn when acquiring his language. Menyuk (1968)

presented 120 children in Kindergarten, Grade I and Grade II with the tasks of learning and reproducing sets of nonsense words some of which were grammatical (could occur in English) and some non-grammatical. She found that the grammatical sequences were learned and could be repeated with greater ease than could the non-grammatical sequences. This suggests the existence in small children of the same kind of sequence rules for sounds of English as there exists for syntax.

Morphology. The morphological system is that which governs the process of combining morphemes into words. Morphemes have been defined as the smallest element of speech to which meaning can be assigned. A word may be composed of one or more morphemes. For example, the word 'cats' consists of two morphemes, 'cat' and the plural suffix /-s/. An understanding of the significance of the plural suffix enables the speaker to derive many plural words. But plurals are formed in another way as well; the plural allomorph of English also includes /-z/, and /-ɪz/ and the child cannot correctly form all the plurals until he knows them and when to use them. There are a great many intricate patterns for the formation of words from roots and derivatives and the child must master the rules for this system as well.

Development of understanding and control of the morphological system apparently begins with the child's learning of some of the inflected and derived forms as separate vocabulary items. He very soon learns to form plurals, change tense, derive adjectives, etc., according to rules which he, in some mysterious fashion, is able to discover from the language which he hears around him. These preliminary rules lead the child to over-generalize and result in such "strange regularities"

(Chukovsky, 1956) as 'Daddy buyed it for me.' and 'See my new shoeses.' which so delight the adults in his life.

The above explanation derives support from the research findings of Berko (1961), Brown and Bellugi (1964), Ervin (1961) and others. Early in their study Brown and Bellugi (1964) noted occurrences in the transcribed speech of the children whose language development they were charting, of the grammatically correct forms 'I came' and 'I saw'. However a few months later these same children had seemingly 'regressed' and were regularly using the forms 'I comed' and 'I seed'. The explanation seems to be that in the first instance 'came' and 'saw' were merely undifferentiated vocabulary items which were used in an imitative way. However, the later incorrect forms were a result of the application of a set of rules, indicating a system being operated by the child. Research on the acquisition of the rules of morphology, while not extensive, indicates that control over the regular rules is gained by age four (Templin, 1957; Kahane, Kahane and Saporta, 1958; Berko, 1961). Gradually the child refines his rules of morphology to include irregular forms and those that occur only infrequently and eventually he attains adult level of competence. This is accomplished sometime after the age of six (Berko, 1961).

Berko (1961) conducted an experimental study of the ability of children in preschool and first grade to apply morphological rules of English to new words. The subjects, age 4 to 7 years, were required to inflect, to derive, to compound nonsense words, and also to analyse known compound words explaining why they are so derived. The test items consisted of stimulus pictures of imaginary creatures to maintain interest and focus attention while the examiner asked the child to complete a sentence about

them. For example, the children were shown a picture of two droplet-shaped creatures and were then asked to complete the following:

"This is a wug.

Now there is another one.

There are two of them.

There are two ____."

Besides plurals, the children were asked to form the past and progressive tenses, possessives (both singular and plural), the third singular of verbs, adjectives, adverbs, and derived agentive.

Findings indicated that, while the ability to apply morphological rules of English did improve with age, even the youngest age group was able to supply the correct answer to more than half the items, suggesting that the ability to apply the regular morphological rules is developed during the child's second and third year. The finding that the first-graders were able to answer correctly only about 30 percent of the items requiring the plural 'es' after words ending in 'ch', 'zh', 's', and 'z', the past 'ed' after 't' and 'd', and the irregular past of 'ring' indicated that by age seven years the child's control over these rules is still incomplete. This lends support to the conclusion of many linguists that language development itself is far from complete by the time the child starts school.

Recent studies in morphology have yielded some indications of an order of acquisition of inflectional derivations. Cazden (1968) described the acquisition of five noun and verb inflections by three subjects over a twelve month period. She attempted to get at linguistic

competence by putting the child in a language context where the desired inflection was obligatory, as did Berko (1961) above. Her results showed that for these three children plurals appeared before possessives, each appearing first in a particular context before being generalized. Also, present progressives preceded pasts and present indicatives.

Herriot (1969) attempted to study the comprehension of tense by young children. He found that, while his investigations were hampered by such factors as inattention of the children and features in the extralinguistic environment, the present and past tenses seemed to be comprehended earlier than the future tense. Research such as this seems to be pointing the way to the day when detailed scales of language acquisition will be available to all who seek to know how language develops in children.

Syntax. The syntactical system of a language is that which governs the way words are arranged into meaningful utterances. It is concerned with such features as word classes (parts of speech), word order, and sentence patterns.

The child's acquisition of syntax is the focus of a great deal of current research, much of which has resulted from the impact of Noam Chomsky and his theory of inherited grammatical competence which slowly manifests itself in the verbal performance of the growing child (John, 1968). Studies by Brown (1964), Slobin (1964), Ervin (1964), Braine (1963), and Menyuk (1964) are notable in this regard. Their findings will be discussed below. Earlier Carroll (1955) theorized that a child learns the grammar of his native language in somewhat the same way that the linguist

analyses grammar by finding substitution groups or form classes. The effect of the research into these and other theories has been to increase greatly our knowledge of the rate and sequence of the child's acquisition of grammatical structures of English.

Research methods in language study have changed with the change of emphasis from obtaining descriptions of language performance to seeking evidence of linguistic competence. Linguistic scientists have devised ingenious tests and techniques which attempt to measure the speaker's underlying competence at each stage of language development. These have generally taken the form of experimental situations which are so structured that the grammatical element being studied is elicited in the response which seems to be a promising method of obtaining information that is specific and reliable. Students of language, however, agree with Chomsky (1964) that both the performance and the competence aspects of language acquisition must be taken into account.

....if anything far reaching and real is to be discovered about the actual grammar of the child, then rather devious kinds of observations of his performance, his abilities and his comprehension in many kinds of circumstances will have to be obtained, so that a variety of evidence may be brought to bear on the attempt to determine what is in fact his underlying linguistic competence at each stage of development. (p. 35)

Perhaps future research patterned after Chomsky's plan will result in a full and complete understanding of the developmental process by which the child acquires his native language. Much is known already, as the review which follows indicates.

Research studies on the acquisition of word classes, while not extensive, have yielded much information. Brown (1957) has shown that

pre-school children have already learned the distinction between mass and count nouns. This finding supports the summary of the stages in the acquisition of word classes presented by McNeill (1966) based on the research done by Brown, Ervin and Braine with records of the speech of two-year old children. This summary indicated that over a five month period (ages 24 to 29 months) these children differentiated the adult classes of article, demonstrative pronoun, adjective and possessive in addition to two large classes unique to their child grammar which Braine labelled Pivot Class and Open Class (Braine, 1963).

Berko and Brown (1960) found that the ability to use part-of-speech membership as a clue to the meaning of a word is developed for count nouns and adjectives well in advance of similar development for the other parts of speech. These investigators worked from the reliable finding that the response words provided by adults in a word association test usually belong to the same part-of-speech as the respective stimulus words, whereas responses from children do not. They devised a study to test the hypothesis that this change in word association is a consequence of the child's gradual organization of his vocabulary into the syntactic classes called parts-of-speech. To test the degree to which the children in this study (in Grades One, Two, and Three) had acquired this organization, a Usage Test was devised in which the children were asked to guess the meaning of a nonsense word after hearing it used twice by the examiner in a context which indicated its word-class. The scores obtained were then compared with the degree to which the child's responses on a word association test agreed with the stimulus words in part-of-speech. It was found that scores on both tests regularly increased with age and

were closely related to one another. It is significant for this present study that even Grade Three children had not reached adult ability to determine part-of-speech membership from syntactic clues, contributing further to the conviction that language development is not complete by the time the child enters school.

Studies of the acquisition of syntactical structures fall into two groups depending on the researchers' views of the nature of English grammar. Those who believe that grammar can be accounted for by phrase structure alone and those who believe that rules of transformation are required to account completely for all the grammatical structures of English.

Studies of phrase structure by Strickland (1962) and Loban (1963) have contributed much to the understanding of the child's acquisition of the various sentence patterns. Using structural linguistic techniques designed to analyse the language of children from kindergarten to sixth grade, Strickland, in Indiana, and Loban, in California, discovered that all sentence patterns were used by all age-groups. Variations with age were found only in the frequency with which each pattern was used, the increase in the number of words spoken, and the dexterity with which children use elements within each syntactic structure to achieve flexibility and variety.

A well-designed study by Hocker that supports and extends the findings of Strickland (1962) and Loban (1963) is reported by Strang (1965). Noting that the speech samples analysed by both Strickland and Loban were obtained from situations in which the child was in conversation with an adult, Hocker wondered what differences might be found in the language

used if the situation were that of a child talking to another child. Accordingly she collected 2500 samples of first grade child/child talk and analysed them for language patterns. Her findings supported the conclusion that all sentence patterns are used by all children in first grade with much variation within the pattern to achieve flexibility. In addition, however, she found that both language patterns and sentence length are influenced by the situation. For example, although the mean sentence length was 4.86 words, the range was from one-word sentences used in play situations to 14 to 17 words used to explain something to a friend. The conclusion reached by Hocker is that children use different language in different situations.

McNeill (1966) described the stages in the development of the rules for transforming the kernel sentences (simple, active, declarative) into other types of sentences, for example, negative, passive, assertive. He drew on the work of Bellugi (1964), Ervin (1964), and Menyuk (1963, 1964) for his data. He detected four stages, starting at age 24 months, when the child used base structure exclusively and noted the gradual introduction of the transformational rules for negation, then the first auxiliary transformations until, by age 36 to 40 months, base structures tended to disappear from the child's speech and there was evidence of a changing system of rules that was more economical and more adult. This led McNeill to the conclusion that the basic process of language acquisition is complete by age three-and-one-half years. The conclusion of the phrase structure studies mentioned above that all sentence patterns were present in the speech of all age groups supports this conclusion of the transformationalists.

Summary. Research findings on the nature of language development in children have established with a fair degree of certainty that the phonemes of English are learned in a certain fixed order and are normally acquired by age six. The regular morphological rules seem to be acquired well in advance of the irregular rules and exceptions, by age four according to Berko, and others. Research has not yet established the age at which adult control over the morphological system is gained but Berko's study indicates that it occurs some time after the age of seven. Several studies have shown that all sentence patterns are present in the speech of kindergarten children indicating that children of four or five years have a good working knowledge of the syntactical system of English. Intuitive understanding of the parts of speech at ages three and four has also been demonstrated by Berko and Brown, Bellugi and Brown, and others. However, it is not yet clearly understood how this knowledge is obtained or at what age conscious control of the syntactical system is acquired.

Ruddell (1967) reviewed the findings to date of the syntactic development of the average child noting that by age six he seems to have achieved a high degree of sophistication in oral language development. This author went on to point out that these findings represent the language development of the 'average' child and cautioned that those who would seek to use these findings to improve the education of children must be alert to the developmental ranges in language growth as related to factors in each child's language environment. The review of research into the effects of environment on language development which follows in a later section of this report will indicate the extent of these

developmental ranges.

Interrelationships of Oral Language and Reading

Dawson (1954) in her summary of research referred to the mounting evidence of the intimate relationships between language ability and reading achievement. She discussed the findings of Hildreth, Artley, Betts, Davis, Kopel and others which supported the relationship. Ten years later Ruddell (1964) and also Hildreth (1964) summarized evidence which either directly or tangentially added to the understanding of this relationship. Hildreth (1964) mentioned her own study in 1935 of a school beginner which indicated that words more often used by the child in speaking are normally easier for him to recall in print and also that of Buckingham (1940) who observed that many pupils who seemed deficient in reading were really deficient in general language ability.

Studies of culturally deprived children recently have been productive of evidence of the interrelatedness of language and reading. Hildreth's review mentioned the work of Brazziel (1962) whose study of such children gave convincing proof of the close association between substandard language usage in young school children and reading deficiency. Brazziel worked with children who had moved into a new dialect area. He found they tended to lag a year or more behind others in reading and ascribed this retardation primarily to the oral language differences involved. More recently Labov (1967) concluded from his investigation into the sources of reading problems for Negro speakers of non-standard English that teachers of beginning reading must let children read the language they know, even though it be non-standard, and keep the teaching

of standard English dialect separate from the teaching of reading.

In 1967, Ruddell again discussed the interrelationships of language and reading stressing the findings of Strickland (1962) and Loban (1963) as well as those of his own studies (Ruddell, 1965). He mentioned Strickland's finding that children who ranked high on measures of comprehension in silent reading made greater use of movables and elements of subordination in their oral language than did children who ranked low on these measures and suggested that this finding indicates that a child's ability to use subordination and movables in oral expression is closely related to his ability to comprehend written language.

According to Ruddell (1967) the longitudinal study of children's language development by Loban (1963) revealed that children who were advanced in general language ability, as determined by vocabulary scores at the kindergarten level and language ratings by teachers, were also advanced in reading ability. The inverse was also found for those of low language ability, leading Loban to conclude that competence in spoken language appears to be a necessary base for competence in reading.

These conclusions of Strickland and Loban prompted Ruddell to carry out two researches which have yielded important findings. The earlier (1965) was an experimental study comparing comprehension of fourth grade children in reading two types of passages. One of these types contained high frequency sentence patterns used in child language and the other type contained low frequency sentence patterns (as determined by the Strickland study). The results favored those passages composed of high frequency sentence patterns when readability levels were controlled.

Ruddell's second study in 1968, involved the development of a reading instruction program for first grade encompassing oral patterns of language structure, identified by the Strickland study. The experimental program consisted of a basal reading program supplemented by special instruction emphasizing the prosodic features of spoken language and punctuation early in the year and, later, the development of meaning change through manipulation of specific elements in the sentence. Findings at the end of Grade I, reported in The Psycholinguistic Nature of the Reading Process, edited by Goodman (1968), indicate that the experimental group scored significantly higher in tests of paragraph meaning and sentence meaning and also were better able to identify words which had irregular grapheme/phoneme relationships than were the control group. By the end of Grade II the superiority of the experimental program was maintained, according to the results of tests obtained at that time.

Research reviewed here suggests that oral language ability is the basis for reading achievement and that, when the school program is designed to emphasize language development, especially vocabulary knowledge and the relation of structure and meaning, reading ability is enhanced.

Influence of Socio-Economic Status on Language Development and Reading Achievement

The effects of social class on language development has been the subject of research since the thirties. Early studies, such as those of McCarthy (1930), Day (1932), and Davis (1937), indicated that language and socio-economic level are positively and significantly related.

Studies of minority groups and institutionalized children found that children from middle class environments who had received adequate mothering in their pre-school years revealed marked and persistent superiority in language facility over children from low socio-economic homes or institutions who had received inadequate mothering during this critical period in language development (Pasamanick and Knoblock, 1955; Anastasi and D'Angelo, 1952). Deutsch (1965) speaks of the direct relationship between linguistic development and social factors as a result of his work with the Verbal Survey project being conducted by the Institute of Developmental Studies of the New York Medical College. Loban (1966) reports a persistent parallel between language proficiency and socio-economic status as a research finding from his thirteen-year study of language development in elementary school children completed in 1965.

Current research into the problem of language inadequacy in lower class children is attempting to determine not only the exact nature of social class language differences but also the reasons for its occurrence. Templin (1957) noted that high socio-economic status was associated with increased complexity of grammatical structure and enlarged vocabulary development. Waetjin (1962) found that culturally deprived children, who are mostly from lower class homes, speak in short, simple, often incomplete sentences with a notable deficiency in the knowledge and use of conjunctions which discourages any well-organized or complex thinking. The study by Thomas (1962) confirmed this finding. He compared his findings for kindergarten children of low socio-economic

areas with those of Templin (1957) for kindergarten children of upper socio-economic status and found that his subjects used a smaller number and variety of words; spoke in shorter sentences; used many more incomplete sentences; used fewer compound and complex sentences with less elaboration; committed more errors such as verb and subject not in agreement, colloquialism and slang, omission of auxiliaries, wrong word order, and misuse of prepositions.

Differences in the kinds of speech patterns used by middle and lower classes were identified by Bernstein (1960) who theorized that they were related to the arbitrary authoritarianism characteristic of parents of lower class homes which demands strict compliance to parental decrees without discussion of alternatives. This finding that lower class children are less verbal than their middle class schoolmates is reported by many other investigators. Carsin and Robin (1960) noted marked differences favoring middle class white children in the ability to communicate on the Vocabulary subtest of the Weschler Intelligence Scale for Children and on the oral definitions in the Ammons Full-Range Vocabulary Test. Cazden is quoted in John (1968) as concluding that on all measures, in all studies, the upper socio-economic children, however defined, are more advanced than low socio-economic children (p. 43).

There is consensus among the experts that the reading achievement of children of lower socio-economic status is generally inferior to that of children of higher socio-economic status. Using an experimental culture-fair test of mental ability, Hess (1950) discovered that by the time white children from the lowest occupational groups are in their tenth year, they are about one year behind the children of top occupational families in

reading and ten points lower in IQ ratings. Negro children of the lowest economic groups were found to be about a year behind the white lowest economic group in reading and six points lower in IQ points at age ten.

Vernon (1957), in her discussion of the relation of social class to reading ability, cites research which clearly shows that differences in reading ability are not directly produced by differences in socio-economic status, but are rather the result of the effects of factors which usually accompany lower income. These factors include lower intelligence, poorer health and physical development, inferior language facility, lower level of aspiration, and less educational opportunity. For example, Gates (1946) concluded from his study that reading disability is not more frequent among children of lower income homes if IQ is held constant. Davis (1965) points out in his discussion of teaching reading to the disadvantaged that, regardless of whether lower socio-economic status bears a direct causal relationship to inferior reading achievement, the two do co-occur and must be anticipated and provided for by the educational program of lower class children.

Sex Differences in Language and Reading

The research literature of sex differences in language development generally confirm that girls develop language faster and better than boys. McCarthy (1954) summarized the research to that time concluding that even when the differences reported were not significant, they consistently favored girls. Girls learn to talk sooner than boys (Vernon, 1960) and talk more. Girls also show superior achievement

throughout their school years in all kinds of language activities (McCarthy, 1954).

There is some small indication that the sex differences which have been observed are more of quality than of degree. Whereas Ames (1964) reported no significant differences in vocabulary size of Grade I boys and girls, an earlier finding of Sampson (1959) indicated that boys scored higher in precision of vocabulary and girls excelled in fluency.

Templin (1957) concluded from her study of articulation that boys take one year longer than girls to reach essential articulatory maturity. No significant sex differences were found in the Berko (1960) study of young children's control over the morphological rules of English even though some differences did show in language output. Menyuk (1961), too, found no sex differences in her study of child grammar. These findings seem to indicate that while girls may perform better than boys, they are not superior in the competence aspects of language achievement.

Sex differences in reading achievement have also been observed and measured by many researchers. The general finding is that girls are superior to boys particularly at the readiness and early reading stages (Carroll, 1948; Balow, 1963). There is some indication that this superiority tends to disappear in the higher grades and among children of high ability (Weintraub, 1968). However, Gates (1961) reported that sex differences (which favored girls) tended to be greater at higher grade levels, while Anderson, Hughes and Dixon (1956, 1957), claim that although girls start to read sooner than boys, once reading skill is acquired both sexes proceed at the same rate.

Two studies in sex grouping for reading instruction have yielded conflicting findings. Tagatz (1966) concluded from his study of Grade I and II classes organized for reading instruction both heterogeneously and homogeneously by sex that boys and girls could learn to read as well when grouped together as when isolated. But Wyatt (1966) reported that the girls in her study of Grade I children scored significantly higher than the boys in reading achievement regardless of grouping or program.

Some indications that sex differences are culturally based are to be found in the research literature. Preston (1962) found that, contrary to the American pattern, German boys were superior to German girls in reading ability. The finding of Balow (1963) that the superiority of girls on a readiness test at mid-year disappeared on a reading achievement test at the end of Grade I when reading readiness was held constant by an analysis of covariance led that investigator to the conclusion that sex differences in reading achievement are culturally based and non-maturational. Perhaps the lack of consensus among the research studies cited is an indication of the changes in child-rearing practices in American culture in the past generation which have the effect of minimizing differences between sexes.

Influence of Chronological Age on Language Development and Reading Achievement

In normal children general language facility increases with age. This is the conclusion which logic and observation demands. However, research into the development of language in children indicates that there are also certain changes in the nature of language as the child

increases in age. Menyuk (1961) noted certain grammatical features which were unique to child language and she was able to write a grammar for children at age three and age seven which differed slightly from each other and from adult grammar. In a later study Menyuk (1964) discovered that while almost all the basic structures of adult grammar are present in children of less than three years of age, the percent of children using transformations rose steadily from age three to seven. She also noted a corresponding decline in the number of omissions, redundancies, and substitutions used during this time. Welch (1967) found from his four-year study of pre-school children that certain aspects of language seemed to be a function of age. These included reduced use of short utterances; increased flexibility in handling fixed slots and movables; increased use of compound sentences; increased use of non-structural elements in oral language. These findings support those of Loban (1963) whose general conclusion from his longitudinal study was that increased complexity and variety within sentence patterns was a function of increased age.

The relationship of chronological age to reading is not a simple one. Experience has shown that while some children do learn to read at the age of three or four, many others experience great difficulty in learning to read even when beginning instruction is delayed to age seven or more. Dechant (1964) states that while it is possible to delay the starting of reading too long past the time the child is ready to learn, slight delay is probably a good thing because to be able to read many skills are necessary that come only with age. (p. 40)

Mental age is generally considered a better indicator of readiness for reading than is chronological age. Evidence of this is provided by Hobson (1948) whose follow-up of bright early entrants revealed these children as equal or superior in both achievement and adjustment to their older classmates. The work of Olson and his theory of total growth has important contributions to this discussion. Gray (1960) reports that Olson was led to conclude that a child's total pattern of growth exerts a greater influence on progress in reading than growth in any one aspect of development.

Recently the whole subject of the age at which a child can learn to read has become the subject of great controversy. Research by Durkin (1961), Brzeinski (1964), Moore (1961) and others has provided convincing evidence that some children as young as three years of age can be taught to read by using appropriate methods and materials. Brzeinski (1964) concluded that a mental age of four and one half years is minimal for beginning reading and that early reading instruction has a measurable, positive, continuing effect. Holmes (1962) concluded from his survey of the matter that learning to read at an early age is a function of the amount of time the teacher has to devote to the child.

On the other hand, a study by Halliwell and Stein (1964) reported that fourth and fifth grade pupils who had entered first grade when 79 to 81 months old were significantly superior to younger fourth grade pupils in reading, spelling and other language skills as measured by the California Achievement Tests. Perhaps the conclusion of Strang, McCullough and Traxler (1967) that chronological age is one of the least

significant elements in reading readiness sets this argument in perspective.

Influence of Mental Age on Language Development and Reading Achievement

The relation between language maturity and intelligence appears to be low but positive. This is the conclusion of Carroll (1960) from his review of research by Spiker and Irwin (1949), Schniederman (1955), Smith (1957), and Templin (1957).

In connection with reading, however, intelligence appears to be more important to success in later grades than in the beginning stages. This is the implication drawn by Dechant (1964) from the finding of Bond and Tinker (1957) that correlations between intelligence and reading were .35 in Grade I and .65 in Grade VI.

Mental age is a better indicator of reading readiness and reading achievement than is IQ, especially at early levels, according to Dechant (1964). A mental age of six years and six months is generally accepted as the optimum-minimum age for beginning reading instruction. Blair and Jones (1960) reported that this was established by research studies of Deputy (1930), Morphette and Washburne (1931) and Dunklin (1940). However, subsequent research evidence does not support this conclusion. Brzeinski (1964) concluded from his study of introducing reading instruction at the kindergarten level in Denver that a mental age of four years and six months was minimal for reading instruction to begin. Holmes (1962) in summarizing the research on early readers concluded that the lower the mental age of the child, the lower the teacher-pupil ratio must be for any real learning to result.

Influence of Family Position on Language Development and Reading Achievement

Birth order appears to influence language development to an important degree. Dawe (1937) found that only children develop language facility faster than children with siblings and these in turn faster than twins. Ralph (1965) reports that findings by Nisbit (1961) and Walters, Connor and Zernich (1964) supported the conclusion that a large family is a handicap in language development. A study to investigate the effects of birth order and social class status on the verbal and non-verbal test scores of 90 bright first-graders in New York City was recently conducted by John (1968). The findings that are pertinent here showed significant birth order differences in Peabody Picture Vocabulary Test scores favoring first-born children. John accounts for this superiority by assuming that the parents of first-born children have more time and interest for that child than they have for subsequent children. Koch (1954) found that the superiority of first-born children to be especially evident if there is at least two years between the first and second child.

The influence of family position on reading achievement appears to be similar to that on language development. Evidence of the superiority of first-born children in reading can be inferred from the findings of studies relating birth order and academic achievement. However, direct evidence concerning reading has been provided by two recent studies. Otto (1965) re-analysed data previously collected on 300 good readers and 300 poor readers and found that eldest and only children tended to be good readers, middle and youngest children tended to be poor readers,

and the children who were second of more than two were neither good nor poor readers. This finding gained support from Chittenden, Foan Zweil and Smith (1968) whose results of an analysis of school achievement records of 129 pairs of first-and second-born children from the same family significantly favored first-borns especially for siblings close in age and for first-born girls. Reading scores in this study showed superiority for first-born children at the .05 level of confidence.

Influence of Preschool Attendance on Language Development and Reading Achievement

A review of research by Mindess and Kelihar (1967) indicates that comparisons of kindergarten attendance with Grade I achievement tend to favor those children who attended kindergarten. Studies by Arkin (1964), Burgess (1965), Geedy (1956), Trusal (1955) and Fast (1957) are mentioned as contributing to this conclusion.

Compensatory programs for culturally-deprived children are providing evidence of the value of preschool education in language development. Early findings of several of these are reported by Brittain (1966) and indicate significant increases in language scores after attendance at a preschool. A later study of note is that of DiLorenzo (1968) who attempted to measure the effects of year-long pre-kindergarten programs on the intelligence and language of disadvantaged children. Scores on the Stanford-Binet, Peabody Picture Vocabulary Test and Illinois Test of Psycholinguistic Abilities were obtained from 465 preschool children, ages 3.6 to 4.6 years, before September in 1965 and after June in 1966. Comparisons indicated significant gains (well beyond the maturational gains of the control group) were made by the

disadvantaged children in receptive language skill. However significant gains beyond normal maturational expectancies were not made by the non-disadvantaged groups indicating perhaps a greater need for preschool experience by educationally disadvantaged children.

Preschool attendance and Grade I reading was studied by Fast (1957) who found that not only did kindergarten attendance facilitate reading in Grade I, but also that evidence of this facilitation could be found in the higher grades as well. Almy (1964) and Burgess (1965) each concluded that increasing evidence supports the assumption that preschool attendance provides rich experience for the child which enhances his intellectual activities, language development, self-assurance, social skill and, hence, the potential for his academic achievement.

SUMMARY

This review of the literature relative to this study may be summarized as follows:

1. Research findings on the acquisition of language in children suggest that, with wide variation, language development is incomplete by age six years; the phonological system being the only one over which adult control is acquired by nearly all children of this age.
2. Oral language proficiency appears to be a necessary base for beginning reading achievement, according to studies of the interrelatedness of the language arts.
3. Socio-economic status appears to be very closely related to both language development and reading achievement.

4. Studies of sex differences in language development tend to favor girls, however recent linguistic studies indicate that these may be differences more in language performance than in linguistic competence. That is, girls and boys may characteristically talk in different ways but they may be equally proficient in terms of the control they exhibit over the various sub-systems of English.
5. Girls tend to perform better than boys on tests of reading achievement. Certain recent studies give support to the belief that these differences may be the result of cultural expectations and not of inherent female superiority.
6. General language facility increases with age in normal children, however, investigation has shown that there are changes in the nature of the language.
7. The relationship of the age of beginning reading instruction and achievement does not appear to be a very simple or a very significant one, according to the studies reviewed.
8. Mental age appears to bear a low positive relationship to language development and a high positive relationship to reading achievement.
9. First-born children were found to excel in both language development and reading achievement in all birth-order studies reviewed.
10. Attendance at a pre-school appears to enhance both language development and success in learning to read.

The research findings that language facility is a necessary prerequisite to beginning reading achievement and that great variation exists in oral language development of children at age six years suggest that it might

be valuable to determine what relationship exists between measures of language competence at the time of school entrance and success in beginning reading. This present study has attempted to investigate this relationship. Results showing a positive relationship would tend to corroborate the conclusions noted above. They would also emphasize the desirability of taking the child's level of language development into consideration when determining whether he is ready for beginning reading instruction.

CHAPTER III

THE EXPERIMENTAL DESIGN

The purpose of this chapter is to describe the sample selected for this study, the standardized and experimental tests used, the pilot study, and the collection and treatment of data.

I. THE SAMPLE

Selection

The data for this study were collected from a sample of Grade I children from two classrooms in a school in south-west Edmonton assigned to the investigator by the administrative officials of the Edmonton Public School Board in 1965. In order to complete the language testing in the shortest possible time and thus minimize the effects of classroom instruction on the language development of the sample, it was decided to limit the number of children tested to thirty-five. As this necessitated the use of more than one classroom, it was decided to ask the teachers to assign approximately half of the sample from each of the two first-grade classes in the school, with an equal number of boys and girls among those named. Any child from a non-English speaking home or with front teeth missing or with functional speech impediments was excluded from the sample in order to restrict the number of variables in language development. The final sample included 17 girls and 18 boys.

Age and Intelligence

The mean chronological age for boys was 74.2 months and for girls was 73.6 months.

Information on intelligence was obtained from the school record cards. All children in the sample had been given the Detroit Beginning First Grade Intelligence Test a week prior to the start of this study as a part of the regular school testing program. This is a group test which the investigator, while acknowledging its limitations as a measure of intelligence, felt was adequate for the purposes of this study. Norms for the Edmonton Public School System have been established. Results of this test provided the investigator with data on the mental age and IQ of each child. The boys ranged in mental age from 77 to 101 months with a mean of 90 months. The girls ranged from 69 to 104 months with a mean mental age of 92 months. Intelligence quotients for boys averaged 108.16 and for girls 113.94.

Socio-Economic Level

The Blishen Occupational Class Scale which ranked and grouped occupations according to combined standard scores for income and years of schooling for Canada in 1951 was used to determine the social class of each member of the sample. The investigator recognized the limitations of this scale due to the criteria used and also the fact that it is based on 1951 statistics and may not reflect the occupational situation of today. However, it is a Canadian scale and it was considered to be more valid than those developed from American occupational data. Six of Blishen's seven classes were represented. The following table shows

the number of boys and girls in each occupational class:

TABLE II

SOCIO-ECONOMIC STATUS OF SAMPLE

Occupational Class	Boys	Girls	Total
Class 1	2	5	7
Class 2	3	4	7
Class 3	4	0	4
Class 4	3	2	5
Class 5	5	5	10
Class 6	1	1	2
Class 7	0	0	0
	<hr/> 18	<hr/> 17	<hr/> 35

Family Position

Information from school records was obtained on the family position of each of the children in the sample. Four boys and no girls were only children; two boys and six girls were eldest children; twelve boys and eleven girls occupied other positions in their families.

Preschool Attendance

School records also provided information that fifteen boys and ten girls had attended playschool and four boys and five girls had attended kindergarten while one boy had attended both and two girls had attended neither. Detailed descriptions of the subjects in this study may be found in Appendix A.

II. TESTING INSTRUMENTS

Language Tests

Three tests of linguistic competence were administered to each child in the study. These tests were designed by the linguists Templin, Berko and Brown for use in language acquisition studies to determine the degree of a child's control over the phonological, morphological and syntactical subsystems of English. This investigator felt that these tests would provide a precise, objective measure of total language competence which would have the added advantage of being quick and easy to administer. It was hoped that one of the benefits of this study might be to bring to the busy primary teacher a fast, simple method of measuring language competence which could be used as a measure of reading readiness.

Templin Test of Articulation. This test was devised by Templin (1957) for use in her study of language skills in children from three to eight years. The ability of children to produce the standard English sounds correctly in words is measured by having the child repeat 98 words containing 176 sound elements including 69 consonant sounds in initial, medial, and final position, 71 double and 19 triple consonant blends in initial, final and final-reversed position, 12 vowels and 5 diphthongs. In all 42 phonemes are tested. To administer this test the investigator pronounced and the subject repeated common English words each containing a specific sound-element. Responses were recorded by the investigator in phonemic transcription. Because of the selection procedures employed for the sample, any responses that did not correspond

to those of an adult native speaker of English were assumed not to have been learned yet by the child. A copy of the Templin Test of Articulation can be found in Appendix B.

Berko Test of Morphology. In her study of the child's acquisition of grammar, Berko (1961) devised a test to explore the child's ability to apply morphological rules of English to unknown words. By asking children in preschool and first grade to inflect and derive non-sense words, and also to explain why certain compound words were so-named, Berko was able to obtain a measure of the child's competence over the morphological system of his language. This competence was then compared with that of a group of adults who also took the test and evidence of developmental trends in the acquisition of the morphology of English was obtained.

The original test contained 27 items which assessed the ability to form plurals, singular and plural possessives, third person singular of verbs, past participles, simple past, comparative and superlative degrees of adjectives and to derive diminutives, agentives and compound words. Each item was presented with a picture of brightly-colored objects, fantasy creatures or men performing various actions. A text, omitting the desired form, was typed on each card. The examiner read the text to the child allowing him to supply the missing word which was usually a nonsense word designed to test the child's use of morphological rules under various phonological conditions. Responses were recorded in phonemic transcription and were scored correct if they corresponded to adult answers.

A final item was added to this test by the author, Berko. In it the child was asked to explain why some of the compound words in his

own vocabulary were so-called. The object of this item was to see if children of ages three to seven are aware of the separate morphemes in compound words. The responses to this item were scored according to the category into which the response fell. There were four categories of responses:

1. Identity: "a blackboard is called a blackboard because it is a blackboard."
2. Function: "a blackboard is called a blackboard because you write on it."
3. One Salient Feature: "a blackboard is called a blackboard because it is black."
4. Etymological Explanation given by Adults:- it takes into account both parts of the word and is not necessarily connected with some salient or functional feature.

This investigator felt that the Berko Test of Morphology was too long to be used in conjunction with the two other language tests, therefore an abridgement of it was made and used in the pilot project to determine the validity of this shortened version. The pilot project is discussed in a later section of this report. The shortened version used in this investigation appears in Appendix B.

Brown and Berko Test of Syntax. Two tests were designed for use in a study to determine whether the change in word associations made typically by children and by adults is a consequence of the child's gradual organization of his vocabulary into syntactic classes. It is a reliable finding of word association research that children make responses that are of a different part-of-speech from the stimulus word whereas adults make responses that are of the same part-of-speech as the stimulus word. The Brown and Berko study (1960) attempted to find an

explanation for this phenomenon. The first of these two tests, a Word Association Test, gave an indication of the extent to which the subjects in the Brown and Berko sample did make associations which correspond to the part-of-speech of the stimulus word. The other test, a Usage Test, measured the subject's ability to use syntactic (part-of-speech) clues to determine the meaning of an unfamiliar word. It was found that scores on both tests increased regularly with age and were closely related to one another, so it was decided to use both of these tests to obtain a measure of syntactic competence in the present study.

On the Word Association Test the subjects were asked to say the first word that came to mind upon hearing each of 36 stimulus words (six each of six parts-of-speech). Responses were recorded by the examiner and scored for agreement with the part-of-speech of the stimulus word.

On the Usage Test, the subjects were introduced to twelve new words (actually pronounceable nonsense syllables) by hearing them each used in two sentences. The two sentences were adequate to place the unfamiliar word in one of six parts-of-speech: the count noun, mass noun, transitive verb, intransitive verb, adjective or adverb. The subjects were then asked to use the new word in a sentence of their own in response to a question by the examiner. These responses were scored correct if the new word was used as the same part-of-speech as that implied by the introductory sentences.

There were two problems for each part-of-speech and a different nonsense word for each problem. Colorful pictures accompanied each problem but were used only to interest the child and maintain his attention;

they gave no clue to the meaning of the nonsense word.

As with the Berko Test of Morphology, the Brown and Berko Test of Syntax was abridged by this investigator by reducing the number of problems for each part-of-speech from six to three for the Word Association Sub-test and from two to one for the Usage Sub-test thus retaining the balance of elements while ensuring that the time of testing for general language competence not become too long for the young subjects of this study. The shortened version of this test also appears in Appendix B.

Reading Tests

The Gates Primary Reading Tests (1958 revision) were used by the Edmonton Public School System to measure reading achievement at the end of Grade I. As these tests correlate well with other measures of reading ability, it was decided to use them as the measure of reading achievement in this study.

The Gates Primary Reading Tests are of three types with three equivalent forms of each test. Two of these types were used in the regular June testing program in the Edmonton Public Schools. They are described below:

Type PWR (Word Recognition). This test is designed to sample the ability to read words representative of the primary vocabulary. It consists of 48 exercises each of which contains four printed words and a picture which illustrates the meaning of one of them. The task is to encircle the word that tells the most about the picture. The time limit for this test is fifteen minutes. The raw score is determined by

subtracting one-third of the wrong answers from the total correct answers. Reading Age, Reading Grade, and percentile norms are provided for this test.

Type PPR (Paragraph Reading). This test consists of 26 paragraphs, each accompanied by illustrations which are to be marked in such a way as to indicate the meaning of the paragraph. Vocabulary and sentence structure of the test units increase gradually in complexity and difficulty and successive passages become longer. This test measures ability to read representative primary grade passages with reasonably thorough understanding. The time for this test is twenty minutes; the raw score is the number of correct responses. Reading Grade, Reading Age, and percentile norms are provided for this test as well.

III. THE PILOT STUDY

A pilot study was conducted in March, 1965 at an elementary school of the Edmonton Public School system. Its purpose was to determine whether an abridged version of the Berko Test of Morphology would indicate differences in Grade I children's ability to apply the morphological rules of English to unfamiliar words with the same sensitivity as the original form.

The regular classroom teacher chose three good and three poor readers from her Grade I class as the investigator was also interested in the relationship between language maturity and reading achievement. Data concerning each child's chronological and mental ages, intelligence quotient, family position, and socio-economic status were obtained from the cumulative records of the school.

Ten of the twenty-seven items in the Berko Test of Morphology along with seven of the fourteen compound words which the children were asked to explain, were administered to each child individually by the investigator. The choice of items was made by reducing the number of instances of each rule but not reducing the number of rules tested. Responses to the ten test items were recorded on an answer sheet by the examiner in phonemic transcription; the children's explanations of why the compound words were so-called were recorded on a tape recorder and transcribed later.

As the results of this shortened version of the Berko Test of Morphology showed a marked similarity to the results obtained by Berko in her original study, it was decided that the abridged test was valid and could therefore be used as one of the sub-tests in the proposed study.

As the results also indicated definitive differences in the performance of the good readers and the poor readers, it was felt that this was an indication of the positive relationship between language maturity and reading achievement hypothesized by the investigator. A detailed account of the pilot study may be found in Appendix C.

No test of syntax was included in the pilot study as a suitable test had not been decided on at that time.

IV. DATA COLLECTION

The data for this study were collected in a period from September, 1965, to June, 1966. Language testing was done by the investigator during the first two weeks of school to minimize any effects that school

might have had on the language maturity of the subjects. Each subject was tested singly in two sessions of approximately fifteen minutes each. Responses were recorded by the examiner on specially prepared answer forms. Scoring for all language tests was done by the investigator according to the criteria established by the originators of the tests. In general the answers were marked correct if the child's response was the same as that which adult speakers of English would make. Scores were obtained for each of the three sub-tests and also for the total language competence of the subjects in this study. These scores were expressed in percentages to permit comparison with those of the studies which originated these tests.

Data on reading achievement were obtained from the two classroom teachers who contributed subjects for this study. Gates Primary Reading Tests, Type PWR, Form 1 (Word Recognition) and Type PPR, Form 2 (Paragraph Reading) were administered to all pupils in Grade I in the school as part of the regular school testing program in June, 1966. Scoring was done by the regular classroom teacher who supplied this investigator with the results of those children who were designated as subjects for this study. Results, in the form of raw scores, were collected for word recognition, paragraph reading, and these were totalled to obtain a total reading score.

Information on the performance of the subjects on these tests was used on the basis of the statistical analysis to follow in Chapter IV. Detailed information on this performance may be found in Appendix D.

V. DATA ANALYSIS

Mean scores and standard deviations of the results of the language and reading tests were obtained.

Two statistical procedures were applied to assess the relationship between the selected variables (articulation, morphology, syntax, total language, sex, chronological age, mental age, family position, preschool attendance, and socio-economic status) and reading achievement:

1. Pearson Product Moment Coefficient of Correlation. This was applied to determine if a linear relationship between the variables exists.
2. Stepwise Multiple Linear Regression. This was applied to determine the relative contributions of the selected variables as predictors of the criterion scores. This regression identifies the best single predictor and continues to identify additional variables which account for successive amounts of variance in the criterion score.

Two regression problems were put to the computer:

1. To determine the relative contributions of each of the predictors (articulation score, morphology score, syntax score, and total language score) in determining each of the criterion scores (word recognition, paragraph reading, and total reading).
2. To determine the relative contribution of the contributing variables (sex, chronological age, mental age, family position, preschool attendance, and socio-economic status) in predicting language achievement (i.e. articulation scores, morphology scores, syntax scores, and total language scores) and reading achievement (i.e.

word recognition scores, paragraph reading scores, and total reading scores).

CHAPTER IV

ANALYSIS OF DATA AND INTERPRETATION OF FINDINGS

In this chapter the following aspects of the data obtained in this study will be examined:

1. Performance on Tests of Language Competence.
2. Performance on Tests of Reading Achievement.
3. Relationship between Language Variables and Reading Variables.
4. Relationship between Contributing Variables and Language Scores.
5. Relationship between Contributing Variables and Reading Scores.
6. Relative Contributions of Language Variables and Reading Variables.
7. Relative Contribution of Each of the Contributing Variables to the Language Variables and Total Reading Scores.

I. PERFORMANCE ON TESTS OF LANGUAGE COMPETENCE

Scores on the tests of language competence constitute a measure of the subjects' success in handling the phonological, morphological and syntactical sub-systems of English. TABLE III shows the results of these three tests in terms of possible score, mean score, and standard deviation of each of these tests. A measure of total language competence was obtained by averaging the scores of the three sub-tests and is also expressed in terms of possible score, mean score, and standard deviation. All raw scores were translated into percentages so that the results of this study could be compared with those of the three studies from which these linguistic tests were derived.

TABLE III

MEANS AND STANDARD DEVIATIONS FOR
TESTS OF LANGUAGE COMPETENCE

Name of Test	Possible Score	Mean	Standard Deviation
Templin Test of Articulation	100	96.885	4.496
Berko Test of Morphology	100	45.196	15.383
Brown and Berko Test of Syntax	100	32.205	14.150
Total Language	100	57.996	8.742

Phonological Competence. On the Templin Test of Articulation the scores ranged from 83 to 100 with a mean score of 96.8. A standard deviation of 4.49 indicated the small spread in scores for this group of 35 subjects. The high scores obtained are quite consistent with those of Templin (1957) who found that the sixty children, age six, in her study could articulate correctly 90 percent of the responses on this test.

Morphological Competence. Scores made by this sample on the Berko Test of Morphology ranged from 15.38 to 76.92. The mean score was 45.20 indicating that this ability was far from achieved by age six for this group of children. The high standard deviation (15.38) showed that the scores were widely dispersed from the mean. This gives indication of a great variation in ability to apply the morphological rules of English to unfamiliar words.

Comparisons with the scores of the children of like age in the original study by Berko (1960) show a similarity of performance. Percentages of correct responses made by Grade I children in the Berko study ranged from 25 to 99 giving evidence of great variation in this ability among those children as well.

Syntactical Competence. On the Brown and Berko Test of Syntax the scores for this sample ranged from 12.50 to 60.51. The mean score was 32.20 with a standard deviation of 14.15.

These figures present a similar picture to that of the test of morphology indicating that the syntactic abilities measured by this test are far from achieved and also that the range of achievement is wide.

On comparison with the performance of the Grade I children in the study for which this test was developed, the performance of this group of subjects shows striking similarity. The mean score for Grade I subjects in the Brown and Berko study was 26.04 percent. This is comparable to the mean score of 32.20 obtained in the present study indicating that these children's ability to perform on this test is approximately equal to that of the children in the original study and that neither group could handle this particular syntactical skill very well.

Total Language Competence. This score ranged from 42.30 to 78.71 with a mean score of 57.99 and a standard deviation of 8.74.

These figures substantiate the conclusion held by many experts in the field that language development is far from complete by school entrance age with very pronounced differences in individual development.

II. PERFORMANCE ON TESTS OF READING ACHIEVEMENT

Scores on the Gates Primary Reading Tests, Type PWR (Word Recognition) and Type PPR (Paragraph Reading) were used to measure success in beginning reading for this sample of Grade I children. Table IV gives the possible score, mean score, and standard deviation for each of the two types of tests and for the total of the two test scores.

TABLE IV

MEANS AND STANDARD DEVIATIONS FOR TESTS OF READING ACHIEVEMENT

Name of Test	Possible Score	Mean	Standard Deviation
Gates Primary Reading Test Type PPR (Paragraph Reading)	26	17.828	5.147
Gates Primary Reading Test Type PWR (Word Recognition)	48	37.228	9.113
Total Reading Score (PPR + PWR)	74	55.057	13.365

Reading achievement, as measured by these tests, indicated that this sample had generally been successful in beginning reading. Application of the mean scores to the tables of age-grade norms provided in the test manual yielded an average reading grade score of 2-8 in word recognition and 2-6 in paragraph reading, well above the actual grade of 1-10. However, standard deviations of 9.11 and 5.15 in word

recognition and paragraph reading respectively give indication of the variation in the performance by individuals on these tests.

III. RELATIONSHIPS BETWEEN LANGUAGE VARIABLES AND READING VARIABLES

The Pearson Product-Moment Correlation was used to determine the relationship between each of the independent language variables (articulation scores, morphology scores, syntax scores and total language scores) and each of the criterion scores (word recognition, paragraph reading, and total reading). These relationships are presented in Table V.

TABLE V

COEFFICIENTS OF CORRELATION BETWEEN LANGUAGE SCORES AND READING SCORES

Language Test Scores	P.P.R. Score	P.W.R. Score	Total Reading Score
Articulation	-0.083	0.086	0.026
Morphology	0.335*	0.470**	0.449**
Syntax	0.059	0.132	0.113
Total Language	0.205	0.348*	0.317

Note: ** $p < .01$ when $r > .43$

* $p < .05$ when $r > .33$ for $df = 33$.

Analysis of this data indicates that the strongest correlations exist between the morphology scores and all three reading scores; the most significant relationship being between word recognition and morphology (.47) and total language and morphology (.45) which attained significance at the .01 level of confidence. The relationship of morphology to paragraph reading (.33) is significant at the .05 level.

TABLE V also shows a significant positive correlation between total language scores and word recognition scores (.35) and correlations approaching the level of significance between total language scores and total reading scores (.31).

These findings provide evidence of a positive relationship between language and reading. However, the negative correlations obtained between articulation and paragraph reading scores, while far from significance level, are interesting nevertheless and will be discussed in Chapter V.

IV. RELATIONSHIPS BETWEEN CONTRIBUTING VARIABLES AND LANGUAGE SCORES

Correlation coefficients were also examined to detect any significant relationships that might be present between the selected contributing variables (sex, chronological age, mental age, family position, preschool attendance, and socio-economic status), and the four language scores for this sample. TABLE VI gives this information.

TABLE VI

COEFFICIENTS OF CORRELATION BETWEEN SELECTED
CONTRIBUTING VARIABLES AND LANGUAGE SCORES

Contributing Variable	Articulation	Morphology	Syntax	Total Language
Sex	-0.231	0.082	0.331*	0.176
Chronological Age	-0.076	-0.004	0.116	0.038
Mental Age	-0.103	0.156	0.052	0.095
Family Position	0.185	-0.241	0.078	-0.060
Preschool Attendance	-0.136	-0.049	0.048	-0.021
Socio-economic Status	0.059	-0.416*	-0.139	-0.307

* $p < .05$ when $r > .33$ for $df = 33$

Examination of TABLE VI shows that significant correlations exist for this sample between sex and syntax scores (.33) and socio-economic status and morphology scores (-.42). Both of these are significant at the .05 level. The positive correlation between sex and syntax scores indicate that the boys in this sample excelled in the test of syntax as, for computer purposes, girls and boys were designated by the numerals 1 and 2 respectively. The positive correlations between sex and syntax indicated that the high scores in syntax were associated with the higher designation for sex, i.e. 2, which was the designation for boys. Similarly, the negative correlation between socio-economic status and morphology scores indicated that the children in the upper

classes showed significant superiority on the test of morphology, because high socio-economic status was designated by low numerals for computer purposes and the association of high scores in morphology with low numerical designations for socio-economic status would produce a negative correlation coefficient.

V. RELATIONSHIPS BETWEEN CONTRIBUTING VARIABLES AND READING SCORES

The correlation coefficients of the selected contributing variables, sex, chronological age, mental age, family position, pre-school attendance, and socio-economic status, and the three reading scores for this sample are shown in TABLE VII.

TABLE VII

COEFFICIENTS OF CORRELATION BETWEEN SELECTED
CONTRIBUTING VARIABLES AND READING SCORES

Contributing Variables	Paragraph Meaning	Word Recognition	Total Reading
Sex	-0.337*	-0.344*	-0.365*
Chronological Age	0.011	0.222	0.156
Mental Age	0.670**	0.668**	0.713**
Family Position	-0.230	-0.307	-0.298
Preschool Attendance	0.271	0.168	0.219
Socio-economic Status	-0.158	-0.328*	0.285

Note: ** $p < .01$ when $r > .43$ for $df = 33$
 * $p < .05$ when $r > .33$

Examination of TABLE VII shows the strongest correlations existing between mental age and the total reading scores (.71), followed by paragraph reading (.67), and word recognition scores (.66), all of which are significant beyond the .01 level of confidence. These findings lend support to the generally accepted conclusion that mental age is a better indicator of reading readiness than is chronological age.

Significant negative correlations are found between sex and scores in total reading, paragraph reading, and word recognition (-.36, -.34, and -.34 respectively), indicating the superiority of the girls on these tests, as girls were designated by a lower numeral than were the boys for purposes of computation, producing a negative correlation.

A significant negative correlation between socio-economic status and word recognition scores shows that the children in the upper classes did significantly better on this test than did those in lower classes, as the upper classes were designated by the lower numerals for data processing purposes.

VI. RELATIVE CONTRIBUTION OF EACH OF THE PREDICTORS TO THE CRITERION VARIABLES

The Stepwise Multiple Regression analysis was used to identify the rank order of the language variables as predictors of the criterion scores (word recognition, paragraph reading, and total reading). TABLE VIII presents this information.

The findings of this analysis indicate that the morphology score variable was the most able predictor of reading achievement for this sample. Scores on the Berko Test of Morphology accounted for

11.20 percent of the variance in the paragraph reading equation; for 22.08 percent of variance in the word recognition equation; 20.19 percent of the variance in the total reading equation. These were significant at or beyond the .01 level of confidence indicating that control over the morphological system of English is an important factor in predicting ability to learn to read.

VII. RELATIVE CONTRIBUTIONS OF EACH OF THE CONTRIBUTING VARIABLES TO THE CRITERION SCORES

A second stepwise multiple regression analysis was performed to discover the relative contributions of the selected contributing variables, sex, chronological age, mental age, family position, pre-school attendance, and socio-economic status, made to the scores in articulation, morphology, syntax, total language, and total reading for this sample. The finding of this analysis, presented in TABLE IX, indicate several significant contributions.

None of the contributing variables made significant contributions to the articulation scores. The order in which they entered the articulation equation was sex, 5.35 percent, family position, 4.90 percent, perschool attendance, 1.69 percent, mental age, 0.77 percent, socio-economic status, 0.30 percent, chronological age, 0.11 percent. Total contribution to the articulation score was 13.15 percent.

Socio-economic status made the most contribution to the morphology score, accounting for 17.27 percent of the variance. This is significant at the .01 level of confidence. The other variables fell below acceptable levels of significance, however, the order in which they fall

TABLE VIII

STEPWISE REGRESSION ANALYSIS OF LANGUAGE VARIABLES
ON TOTAL READING SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Morphology	8.347	12.120	0.006**	20.188	20.188
Step 2	Total Language	0.821	12.153	0.371	1.997	22.185
Step 3	Articulation	0.893	12.330	0.767	0.224	22.409
Step 4	Syntax	0.318	12.467	0.576	0.816	23.225
** p < .01						

TABLE VIII (cont.)

STEPWISE REGRESSION ANALYSIS OF LANGUAGE VARIABLES
ON WORD RECOGNITION SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Morphology	9.352	8.166	0.004**	22.081	22.081
Step 2	Syntax	0.660	8.208	0.422	1.575	23.656
Step 3	Articulation	0.131	8.322	0.719	0.324	23.980
Step 4	Total Language	0.574	8.379	0.454	1.427	25.407

** $p < .01$

TABLE VIII (cont.)

STEPWISE REGRESSION ANALYSIS OF LANGUAGE VARIABLES
ON PARAGRAPH READING SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Morphology	4.162	4.924	0.049*	11.200	11.200
Step 2	Total Language	1.024	4.922	0.319	2.754	13.954
Step 3	Syntax	0.176	4.987	0.677	0.485	14.439
Step 4	Articulation	0.031	5.066	0.860	0.090	14.529

* $p < .05$

TABLE IX

STEPWISE REGRESSION ANALYSIS OF SELECTED CONTRIBUTING VARIABLES
ON ARTICULATION SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Sex	1.867	4.440	0.181	5.355	5.355
Step 2	Family Position	1.749	4.391	0.195	4.905	10.260
Step 3	Preschool Attendance	0.597	4.419	0.445	1.695	11.955
Step 4	Mental Age	0.266	4.472	0.609	0.774	12.729
Step 5	Socio-Economic Status	0.101	4.540	0.752	0.305	13.034
Step 6	Chronological Age	0.038	4.618	0.846	0.119	13.153

* $p < .05$ ** $p < .01$

TABLE IX (cont.)

STEPWISE REGRESSION ANALYSIS OF SELECTED CONTRIBUTING VARIABLES
ON MORPHOLOGY SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Socio-economic Status	6.890	14.202	0.013*	17.272	17.272
Step 2	Family Position	2.324	13.925	0.137	5.603	22.875
Step 3	Sex	1.288	13.863	0.265	3.077	25.952
Step 4	Preschool Attendance	0.917	13.882	0.345	2.198	28.150
Step 5	Mental Age	0.655	13.962	0.424	1.587	29.737
Step 6	Chronological Age	0.000	14.209	0.985	0.001	29.738

* $p < .05$ ** $p < .01$

TABLE IX (cont.)

STEPWISE REGRESSION ANALYSIS OF SELECTED CONTRIBUTING VARIABLES
ON SYNTAX SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Sex	4.070	13.352	0.0518*	10.979	10.979
Step 2	Socio-economic Status	1.278	14.398	0.266	3.419	14.398
Step 3	Chronological Age	0.312	13.643	0.580	0.852	15.250
Step 4	Preschool Attendance	0.153	13.833	0.698	0.430	15.681
Step 5	Mental Age	0.132	14.037	0.718	0.383	16.064
Step 6	Family Position	0.058	14.271	0.810	0.175	16.239

* $p < .05$ ** $p < .01$

TABLE IX (cont.)

STEPWISE REGRESSION ANALYSIS OF SELECTED CONTRIBUTING VARIABLES
ON TOTAL READING SCORES

	Variable Entering	F Value	Standard Error	Prob. Level	Variance	Total Variance
Step 1	Mental Age	34.235	9.504	0.00001**	50.919	50.919
Step 2	Sex	4.744	9.007	0.036*	6.334	57.253
Step 3	Family Position	2.312	8.828	0.138	2.968	60.221
Step 4	Socio-economic Status	2.038	8.684	0.163	2.531	62.752
Step 5	Preschool Attendance	1.252	8.647	0.272	1.542	64.294
Step 6	Chronological Age	0.178	8.773	0.676	.225	64.519

* $p < .05$ ** $p < .01$

when their contributions are arranged in descending fashion is of interest. The order is, from greatest to least contribution, socio-economic status, family position, sex, preschool attendance, mental age, and chronological age. The total contribution of these variables on the morphology score was 29.74 percent.

Sex accounted for 10.92 percent of the variance in the syntax equation, which is significant at the .05 level, indicating that boys had the advantage in performance on the test of syntax. The order in which the remaining variables contributed to the total variance in the syntax equation was socio-economic status, 3.42 percent, chronological age, 0.85 percent, preschool attendance, 0.43 percent, mental age, 0.38 percent, and family position, 0.175 percent. Altogether these variables accounted for 16.23 percent of the variance in the syntax equation.

Mental age made the most contribution to the total reading equation, accounting for 50.92 percent of variance (level of significance, beyond .01), followed by sex which contributed 6.33 percent to the total reading equation, (level of significance .05). The order in which the other variables fell in the regression equation was: family position, 2.97 percent, socio-economic status, 2.531 percent, preschool attendance, 1.54 percent, and chronological age, 0.22 percent. None of these contributions reached the level of confidence required. The total contribution which these contributing variables made on the total reading scores was 64.52 percent.

These findings indicate that, from the data provided by the 35 children in this study, socio-economic status was a significant

predictor of high morphology scores; mental age was of high significance in predicting high scores on the Gates Primary Reading Tests; being of the male sex was significant in predicting high scores on the syntax test, whereas being a girl was significant in predicting high scores on the total reading test.

VIII. SUMMARY OF FINDINGS

The findings resulting from the interpretation of the data are summarized as follows:

1. Scores obtained on the linguistic tests indicate that with wide variation the children in this sample have not attained adult control over the designated aspects of the morphological and syntactical systems of English, but have all-but-attained adult control over the phonological system.
2. Highest positive correlations were found between morphology scores and word recognition, paragraph reading and total reading scores.
3. Morphological competence contributed significantly to reading achievement. Morphology scores accounted for 22.08 percent of variance in the word recognition scores, 20.19 percent of variance in the total reading scores, and 11.20 percent of variance in the paragraph reading scores.
4. Significant correlation was found between the total language and word recognition scores.
5. Positive correlations approaching the level of significance were obtained between total language and total reading scores.

6. Boys performed significantly better than girls on the test of syntax, while girls showed significant superiority in all measures of reading achievement.
7. Children in the higher socio-economic levels showed a significant superiority on the test of morphology and on the test of word recognition. High socio-economic status made a significant contribution to the morphology equation.
8. Mental age correlated very highly with all measures of reading achievement and accounted for 50.95 percent of the variance in the total reading equation.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

A summary of this study will be presented in this final chapter together with a summary of the findings. Conclusions derived from the findings, implications for education, for the teaching of reading and suggestions for further research will also be considered.

I. SUMMARY

The purpose of this study was to produce empirical evidence of the relationship which is believed to exist between level of language competence and reading achievement. Linguistic tests to measure the child's control of the phonological, morphological, and syntactic sub-systems of English were administered to 35 Grade I children in September, 1965. Information on selected variables which contribute to language development and reading achievement (sex, chronological age, mental age, family position, preschool attendance, and socio-economic status) was obtained for each child in the sample from the school records at that time.

Success in beginning reading was determined by performance on the Gates Primary Reading Tests, (1958 revision), Type PWR (Word Recognition) and Type PPR (Paragraph Reading) in June, 1966, after the subjects had completed one year in school.

The three tests of language competence were administered, recorded, and scored by the investigator. The reading tests were given to the

children in the sample, along with the rest of the children in Grade I in that school, as part of the regular June testing program. Scoring was done by the two teachers whose classes were involved in this study.

Analysis of data to determine the relationships among the measures of reading and the selected contributing variables was done by means of the Pearson Product-Moment Correlation. The power of each of the language variables to predict achievement in reading was investigated by means of a stepwise multiple linear regression analysis. This technique was also employed to assess the relative contributions of each of the selected contributing variables to each of the three language scores, to the total language score, and to the total reading score.

II. CONCLUSIONS

In order to determine the relationship that exists between language and reading at the Grade I level, the following research hypothesis was formulated:

Research Hypothesis: Children who have developed greater competence in language before entering school will be more successful in learning to read than will children who are linguistically less competent.

The following operational null hypotheses corresponding to the research hypothesis were tested. Conclusions concerning their acceptance or rejection are discussed below:

Hypothesis 1.

There is no significant relationship between the scores

obtained by children in June of their Grade I year on the Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word Recognition), and the scores obtained by the same children on entering Grade I the previous September on:

- a. The Templin Test of Articulation.
- b. The Berko Test of Morphology.
- c. The Brown and Berko Test of Syntax.

Analysis of data yielded no evidence of a significant relationship between scores on The Templin Test of Articulation and The Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word Recognition). Therefore part a. of Hypothesis 1 is accepted.

Significant positive correlations were obtained for The Berko Test of Morphology and all scores of The Gates Primary Reading Tests. Additional evidence of this relationship was found in the significant contributions made by the morphology scores to the total word recognition, paragraph reading and total reading equations. On the basis of this evidence, Hypothesis 1 b. is rejected.

The correlations obtained between scores of The Brown and Berko Test of Syntax and those of the Gates Primary Reading Test failed to reach a level of significance. Neither did the syntax scores show significant predictive power in any of the reading equations. Therefore Hypothesis 1 c. must be accepted.

Hypothesis 2.

There is no significant relationship between the total language scores on the Linguistic Competence Test obtained by children in September of their Grade I year and the scores obtained by the same children in June of their Grade I year on The Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word

Recognition).

The significant positive correlation obtained for the measure of total linguistic competence and the measure of word recognition indicates that linguistic competence is positively related to that aspect of beginning reading. Further indication is found in the correlation of total language and total reading that fell just below a level of significance. On the basis of this evidence, Hypothesis 2 is accepted with reservation.

Hypothesis 3.

There is no significant relationship between the measures of linguistic competence and certain aptitudes and characteristics assumed to be associated with linguistic competence, as the following:

a. Sex. The finding that boys performed significantly better than girls on the Brown and Berko Test of Syntax is interesting as it does not support the findings of much of the research into sex differences in language development. No significant differences were found in the performance of boys and girls on the articulation, morphology, or total language scores, however, and so this part of Hypothesis 3 must be accepted with reservation.

b. Chronological Age. No significant differences were found between the performances of older and younger children in this study, therefore this part of the hypothesis is accepted.

c. Mental Age. No significant differences were found in performance on the Linguistic Competence Test that could be attributed to differences in mental age as measured by the Detroit Beginning First Grade Intelligence Test. This part of Hypothesis 3 is accepted.

d. Family Position. No significant differences were found in the performance of first-born and subsequent children on the Linguistic Competence Test. This part of Hypothesis 3 is accepted.

e. Preschool Attendance. No significant differences were found in the performance of children who had attended kindergarten or play-school before entering Grade I and those who had not. Therefore Hypothesis 3 e. is accepted.

f. Socio-economic Status. Significant positive correlations were found between high socio-economic status and morphology, but not articulation, syntax, or total language scores. On the basis of this evidence, Hypothesis 3 f. must be accepted with reservation.

Hypothesis 4.

There is no significant relationship between the measures of reading achievement used in this study and certain aptitudes and characteristics of the subjects assumed to be related to reading achievement, as the following:

a. Sex. Findings showed that girls performed significantly better than boys in all measures of reading achievement, therefore this part of Hypothesis 4 is rejected.

b. Chronological Age. No significant differences were found in the performance of younger and older children on the Gates Primary Reading Tests, Type PPR (Paragraph Reading) and Type PWR (Word Recognition) in this study. This part of Hypothesis 4 is accepted.

c. Mental Age. Very high correlations were obtained between mental age and all measures of reading achievement. Hypothesis 4 c. is therefore rejected.

d. Family Position. No significant differences were found in the performance of first-born and subsequent children on the tests of reading achievement in this study. This part of Hypothesis 4 is accepted.

e. Preschool Attendance. Findings obtained indicated no significant differences in the performances of those children who had attended a kindergarten or play-school before entering Grade I and those who had not. This part of Hypothesis 4 is accepted.

f. Socio-economic Status. Children in the higher socio-economic levels score significantly higher on the tests of word recognition, but not on the test of paragraph reading nor when the two scores were totalled. On the basis of this evidence Hypothesis 4 f. must be accepted with reservation.

III. ADDITIONAL FINDINGS AND CONCLUSIONS

Other conclusions which seem warranted from the findings of this study are discussed below:

1. The conclusion that reading achievement of subjects at the end of Grade I is a function of the control which they exhibit over the designated aspects of the phonological, morphological, and syntactical systems of their language at the beginning of Grade I follows from the evidence presented in Hypothesis 2. It follows that the Linguistic Competence Test used in this study is an able predictor of success in beginning reading when administered before any reading instruction is undertaken. It is also evident that the shortened version of the Berko Test of Morphology, which formed one of the sub-

tests of the Linguistic Competence Test, is an especially sensitive instrument for such prediction.

The low correlations obtained between scores on the Brown and Berko Test of Syntax and those on the Gates Primary Reading Tests are surprising in view of the high correlations obtained by other researchers using linguistic tests of syntactical competence. A possible explanation is that the aspects of syntactical competence measured by this test are not so important to beginning reading achievement as some others might be. There is some evidence that facility with the structural aspects of language is positively correlated with success in reading, (Strickland, 1962; Loban, 1963; Ruddell, 1965, 1968). The last-mentioned study by Ruddell obtained high positive correlations between a test of syntactical structure and all measures of reading achievement with a sample of Grade I children. Perhaps the use of such a test of syntax would have yielded higher correlations in this study and given empirical evidence of the relationship to which logic and expert opinion attest.

2. The similarity of the scores obtained by this sample on the three tests of linguistic competence used in this study and those reported for subjects of like age in the original studies for which these tests were devised gives indication of their reliability. As one of the purposes of this study is to find a measure of linguistic competence which does have predictive power concerning reading achievement, this evidence of reliability is important.

3. The language scores obtained indicated that the morphological and syntactical aspects of language acquisition, as here measured, are far from complete in all children at the time of school entrance. This conclusion differs from those of much of the language development research which generally concludes, as did Ruddell (1967), that by age six the average child seems to have achieved a high degree of sophistication in oral language development. Ruddell appears to accept this conclusion but cautions his readers to be aware of the developmental ranges which the word 'average' implies. It is here suggested that whereas the average child of six years may have achieved a good working knowledge of language, (i.e. his linguistic performance is adequate to his communication needs), his conscious control of the various sub-systems (i.e. his linguistic competence) is far from attained.
- Weintraub (1968) reviewed the literature on oral language and reading and attributed the lack of strong positive correlations found to the inadequacy of the measures of language development. He claimed that most measures reveal more quantitative than qualitative differences in the language used. The findings of this present study did reveal strong positive correlations between oral language development and reading. Perhaps this finding is due to the fact that the measures of language used did reveal qualitative language differences and is more reliable thereby than those of the studies which measured only quantitative differences in oral language development. Furthermore, if the conclusion that a high degree of

sophistication in oral language development is achieved by the average child of six years is based on the findings of these previous studies, then perhaps this conclusion pertains only to quantitative differences in language used. This study suggests that the kind of language maturity that relates highly with success in learning to read may be the qualitative kind that is measured by such tests as were used in this study, i.e. tests of control over the various systems of language, and that maturity of this kind is far from attained by the time the average child enters school.

4. The fact that the articulation scores in this study made no significant contribution to reading achievement does not necessarily indicate that phonological competence is unrelated to reading achievement. There is an abundance of research evidence that children with speech defects experience more difficulty in learning to read than do normal speakers. The suggestion made here is that there is a threshold in the development of a skill which, when passed by the majority of learners, tends to minimize the effect of that skill on measures of subsequent related skills due to the tendency for scores to cluster towards the mean. In the case of phonological competence, it appears that functional control is attained by most children by age four. If this can be regarded as the threshold referred to above, then by age six that threshold is so far passed that the relationship of phonological control is minimized in measures of the related activity of learning to read because of the high mean score (in this study 96.88) and the small standard deviation (here,

4.49). If this phenomenon is the correct explanation, then it appears that a test of phonological competence need not be included in a test of language competence for normal children of six years of age.

5. The findings concerning the influence of socio-economic status on skill in word recognition and control over the morphology of language lend support to the conclusion of much social class research that, in Cazden's words:

"...on all measures, in all studies, the upper socio-economic status children, however defined, are more advanced than the lower socio-economic children."
(quoted in John (1968), p. 43).

6. The very high positive correlations found between mental age and all measures of reading achievement reflect the generally-accepted conclusion among educators that mental age is a better predictor of reading readiness than is chronological age.
7. The girls in this study excelled in reading achievement, adding to the body of research evidence of the superiority of girls in this regard, however, the interesting finding that the boys in this study score significantly higher than the girls on the syntax test does not support the conclusion of most recent linguistic research that no significant sex differences exist in the development of linguistic competence in children.

IV. LIMITATIONS OF THE STUDY

The application of the findings and conclusions of this study are limited by the small size of the sample used, which numbered only thirty-five children. As this was an exploratory study no attempt was made to make the sample representative of the population at large beyond requesting permission from the Edmonton Public School Board to use a school which was known by the investigator to serve a community which contained a wide range of economic levels. Both of these factors must be considered in evaluating the findings, conclusions, and implications of this study.

V. IMPLICATIONS FOR EDUCATION

These findings and conclusions just discussed lead to the following implications for teaching practices and for education:

1. As paragraph reading and word recognition achievement for children at the end of Grade I appears to be a function of the control which the children exhibit over the aspects of their morphological language systems measured by the Berko Test of Morphology at the beginning of first grade, it is possible that this test may be used to increase the predictive validity of existing readiness tests.
2. The language test performance of this sample gave indication of the wide range of individual differences that exist in the control which beginning first grade children exhibit over the various systems of language. This leads to the implication that it is important to identify those who have language deficiencies so that reading instruction

may be with-held until such time as they are linguistically ready to read, and thus avoid possible frustration and failure for this reason.

The Berko Test of Morphology could serve as a diagnostic, as well as a predictive instrument providing information concerning the child's level of control over the morphological language system.

3. A further implication is that, after the children of low linguistic competence have been identified they should receive instruction that will assist them in developing the control they lack. Activities suited to their level could be included in the readiness program which would facilitate the ability to apply the morphological and syntactical rules to their own oral language to the end that these children would become more proficient listeners and speakers of English. Such a program would surely enhance their chances of success in beginning reading by equipping them with adequate linguistic skill on which to base their understanding and interpretation of the written word.
4. Teachers of school beginners might take notice of the findings of this study that imply that instruction in reading is rendered more difficult for the young student who does not possess adequate facility with his language. This should alert the conscientious teacher to the need to determine the level of linguistic competence of her pupils at the outset of school and to delay instruction in reading for those children who exhibit little control over the morphology and syntax of English.

VI. SUGGESTIONS FOR FURTHER RESEARCH

The findings and conclusions from the study described herein produced the following suggestions for further research:

1. This was a small, exploratory study using tests of uncertain validity. The findings concerning the Berko Test of Morphology seem to warrant its use with a larger population to verify the conclusions of this study that it does have predictive capability regarding reading achievement. Also this would enable norms to be established which would assist in the identification of children who are deficient in control over the morphological language system.
2. The Brown and Berko Test of Syntax failed to correlate significantly with the measures of reading achievement. The suggestion was made that the low correlations obtained were due more to the aspects of syntactical competence measured than to the unrelatedness of syntactical control to beginning reading. Difficulties in the adaptation of this test may also be a contributing factor here. Reference was made to a test measuring certain structural aspects of syntactical competence used in a similar study by Ruddell (1968), which produced significant correlations with measures of reading achievement. Further research is needed to develop a valid and reliable measure of syntactical competence.
3. The implication that a program of instruction be provided to facilitate the attainment of control over the morphological and syntactical systems of language in those children identified as being deficient in these competencies suggests that research is needed to investigate the efficacy of such a program in achieving this control.

4. Further research is needed to determine the minimum level of linguistic competence that is required before the child can be identified as being linguistically ready to learn to read.

VII. CONCLUDING STATEMENT

This study has examined the relationship of beginning reading achievement to three aspects of linguistic competence, namely, control of the phonological, morphological, and syntactical systems of English. Results indicated that phonology makes little contribution to the prediction of reading achievement for the reason that adult control appears to be achieved by most children well before the age of school entrance. Indications were that morphology and syntax do have high predictive validity in this regard. Further research is needed to devise measures of linguistic competence which will enable us to extend and refine our understanding of the contribution of morphological and syntactical control to the ability of Grade I children to learn to read.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Almy, Millie. "New Views on Intellectual Development in Early Childhood Education." in Intellectual Development: Another Look. Washington, D.C.: Assn. of Supervision and Curriculum Development, 1964.
- Ames, Wilber S. "The Understanding Vocabulary of First-Grade Pupils." Elementary English, 1964, 41, 64-68.
- Balow, Irving H. "Sex Differences in First Grade Reading." Elementary English, 1963, 40, 303-306, 320.
- Banning, Evelyn I. "Family." in Harris, C. W. (Ed.), Encyclopedia of Educational Research, Third Edition. New York: The MacMillan Company, 1960, 511-516
- Berko, Jean. "The Child's Learning of English Morphology." in Saporta (Ed.) Psycholinguistics: a Book of Readings. New York: Holt, Rinehart and Winston, 1961, 359-375.
- Blair, Glenn M. and Jones, R. Stewart. "Readiness." in Harris, C. W. (Ed.) Encyclopedia of Educational Research, Third Edition. New York: The MacMillan Co., 1960, 1081-1086.
- Braine, Martin I. "The Ontogeny of English Phrase Structure: The First Phase." Language, 1963, 39, 1-13
- Brittain, Clay V. "Preschool Programs for Culturally Deprived Children." Children, 1966, 13, 130-134.
- Brown, Roger W. "Linguistic Determinism and the Part of Speech." Journal of Abnormal and Social Psychology, 1957, 55, 1-5.
- Brown, Roger and Bellugi, Ursula. "Three Processes in the Child's Acquisition of Syntax." Harvard Educ. Review, 1964, 34(2).
- Brown, R. W. and Berko, Jean. "Psycholinguistic Research Methods." in Mussen, P. H. (Ed.), Handbook of Research Methods in Child Development. New York: John Wiley & Sons, 1960.
- Brown, Roger and Berko, Jean. "Word Association and the Acquisition of Grammar." Child Development, 1961, 31, 1-14.
- Brown, Roger and Fraser, Colin. "The Acquisition of Syntax." in Bellugi, U. and Brown, R. W. (Eds.) The Acquisition of Language. Monog. Soc. for Research in Child Development, 1964, 29(1), 43-79.

- Brzeinski, Joseph E. "Beginning Reading in Denver." The Reading Teacher, 1964, 18, 16-21.
- Buckingham, B. R. "Language and Reading - a Unified Program." Elementary English Review, 1940, 17, 11-17
- Burgess, Evangeline. Values in Early Childhood Education. Washington, D. C.: National Education Association, 1965.
- Buswell, G. T. "Fundamental Reading Habits: A Study of their Development." Supplementary Educational Monographs, No. 21. Chicago: University of Chicago Press, 1922.
- Cardon, Bartell W. "Sex Differences in School Achievement." Elementary School Journal, 1968, 68, 427-434.
- Carroll, John B. The Study of Language: A Survey of Linguistics and Related Disciplines in America. Cambridge: Harvard University Press, 1953.
- Carroll, John B. "Language Development." in Harris, C. W. (Ed.) Encyclopedia of Educational Research, Third Edition. New York: The MacMillan Company, 1960, 744-752.
- Cazden, Courtney B. "The Acquisition of Noun and Verb Inflections." Child Development, 1968, 39, 434-448.
- Cazden, Courtney B. "Some Implications of Research on Language Development for Pre-School Education." in Hess, R. D. and Bear, R. M. (Eds.) Early Education: Current Theory, Research and Action. Chicago: Aldine Pub. Co., 1968.
- Cazden, Courtney B. "Environmental Assistance to the Child's Acquisition of Grammar." Dissertation Abstracts, 1969, 29A, 2144-2145.
- Chittenden, E. A., Foan, M. Wendy, Zuveil, Dianne M., and Smith J. R. "School Achievement of First and Second-Born Siblings." Child Development, 1968, 39, 1223-1228
- Chomsky, Noam. Syntactic Structures. 's Gravenridge, Holland: Mouton & Co., 1958.
- Chukovsky, I. From Two to Five. M. Morton (Ed.) Berkley: University of California Press, 1963.
- Clausen, John A. "Family Structure, Socialization, and Personality." in Hoffman and Hoffman (Eds.) Child Development Research, Vol. II. Russell Sage Foundation, 1966, 1-53.

- Davis, Edith A. The Development of Linguistic Skill in Twins, Singletons with Siblings, and Only Children from ages 5 to 10. University of Minnesota Press, 1937.
- Dawson, Mildred A. "Interrelations Between Speech and Other Language Arts Areas." Elementary English, 1954, 31, 223-233.
- Dechant, E. V. Improving the Teaching of Reading. Englewood Cliffs, N. J.: Prentice-Hall, 1964.
- DiLorenzo, Louis T. "Effects of Year-Long Pre-Kindergarten Programs on Intelligence and Language of Educationally Disadvantaged Children." Journal of Experimental Education, 1968, 36 (3), 36-42
- Durkin, Dolores. "Early Readers - Reflections after Six Years of Research." The Reading Teacher, 18, 1964, 3-7
- Ervin, Susan M. and Miller, W. R. "Language Development." in Stevenson, H. W. (Ed.) Child Psychology, 62nd Yrbk. National Society for the Study of Education. Chicago: University of Chicago Press, 1963, 108-143.
- Fast, Irene. "Kindergarten Teaching and Grade I Reading." Journal of Educational Psychology, 1957, 48, 52-57.
- Fleming, James T. "Oral Language and Beginning Reading: Another Look." Reading Teacher, 1968, 22, 24.
- Gamlin, Peter. "The Interaction of Meaning and Syntax in Sentence Comprehension." Child Study, Bulletin of the Institute of Child Study. Toronto: University of Toronto Press, 1969, 30, 3-13.
- Gates, Arthur I. "Sex Differences in Reading Ability." Elementary School Journal, 1961, 61, 431-434.
- Goodman, K. (Ed.) The Psycholinguistic Nature of the Reading Process. Detroit, Mich: Wayne State University Press, 1968.
- Halliwell, J. W. and Stein, Belle W. "A Comparison of the Achievement of Early and Later School Starters in Reading." Elementary English, 1964, 41, 631-639.
- Herriot, Peter. "The Comprehension of Tense by Young Children." Child Development, 1969, 40, 103-109.
- Hildreth, Gertrude. "An Individual Study of Word Recognition." Elementary School Journal, 1935, 35, 606-619.
- Hildreth, Gertrude. "Linguistic Factors in Early Reading Instruction." The Reading Teacher, 1964, 18, 172-178.

- Holmes, Jack A. "When Should and Could Johnny Learn to Read?" Challenge and Experiment in Reading. Proceedings of the International Reading Assn. Conference, 1962, 7, 237-242.
- Hunt, Kellogg W. "Recent Measures in Syntactic Development." Elementary English, 1966, 43, 732-739.
- Irwin, O. C. "Development of Speech During Infancy: Curve of Phonemic Frequencies." Journal of Experimental Psychology, 1947, 37, 187-193
- Jakobson, Roman and Halle, Morris. Fundamentals of Language. 's-Gravenhage, Holland: Mouton & Co. 1956.
- John, Vera. "Children and Language Acquisition." in Frazier, A. (Ed.) The New Elementary School. National Education Assn., 1968, 38-51.
- Koch, Helen. "The Relation of Primary Mental Abilities in 5 and 6 yr. olds to Sex of Children and Characteristics of His Siblings." Child Development, 1954, 25, 209-223.
- Leopold, Werner F. "Patterning in Children's Language Learning." Language Learning, 1953-54, 1-14.
- Lewis, M. M. Infant Speech: A Study of the Beginnings of Language. New York: Humanities Press, 1951.
- Loban, Walter D. The Language of Elementary School Children. Research Report No. I. Champaign, Ill: National Council of Teachers of English, 1963, 92.
- Maddox, Agnes G. "A Comparison of Speech Development and Reading Readiness of First Grade Children in Rhea County, Tenn." Unpublished M.S. thesis, University of Tennessee, 1957.
- McCarthy, Dorothea. "Language Development in Children." in Carmichael, Leonard (Ed.) A Manual of Child Psychology, Second Edition. New York: Wiley, 1954, 492-630.
- McNeill, David. "Developmental Psycholinguistics." in Smith, F. and Miller, G. A. (Eds.) The Genesis of Language. Cambridge, Mass.: M.I.T. Press, 1966, 15-84.
- Menyuk, Paula. A Descriptive Study of the Syntactic Structures in the Lang. of Children: Nursery School and First Grade. Boston Univ. School of Education. Ann Arbor, Mich: University Microfilms, Inc. 1961.

- Menyuk, Paula. "Syntactic Rules Used by Children from Pre-School through First Grade." Child Development, 1964, 35, 533-546.
- Menyuk, Paula. "Children's Learning and Reproduction of Grammatical and Non-Grammatical Phonological Sequences." Child Development, 1968, 39, 849-859.
- Mindness, Mary and Kelihar, Alice. "Review of Research Related to the Advantages of Kindergarten." Childhood Education, 1967, 43, 505-512.
- Moore, Omar K. "Tis Time He Should Begin to Read." Carnegie Corporation of New York Quarterly, 1961, 9, 1-3.
- Otto, W. "Family Position and Success in Reading." The Reading Teacher, 1965, 19, 119-123.
- Petty, Walter T. "Needed Research in Oral Language." Elementary English, 1967, 44, 262-264.
- Popham, W. James. Educational Statistics: Use and Interpretation. New York: Harper and Row, 1967.
- Preston, Ralph C. "Reading Achievement of German and American Children." School and Society, 1962, 90, 350-354.
- Raph, Jane Beasley. "Language Development in Socially Disadvantaged Children." Review of Educational Research, 1965, 35, 389-400.
- Ruddell, Robert B. "The Effect of the Similarity of Oral and Written Patterns of Language Structure on Reading Comprehension." Elementary English, 1965, 42, 403-410.
- Ruddell, Robert B. "Oral Language and the Development of Other Language Skills." in Petty, Walter T. (Ed.) Research in Oral Language. Champaign, Ill: National Council of Teachers of English, 1967, 10-20.
- Ruddell, Robert B. "The Relation of Regularity of Grapheme-Phoneme Correspondences and of Language Structure to Achievement in First-Grade Reading." in Goodman, K. (Ed.) The Psycholinguistic Nature of the Reading Process. Detroit, Mich: Wayne State Univ. Press, 1968, 255-270.
- Ruddell, Robert B. "Reading Instruction in First Grade with Varying Emphasis on the Regularity of Grapheme-Phoneme Correspondences and the Relation of Language Structure to Meaning - Extended into Second Grade." The Reading Teacher, 1967, 20, 730-739.

- Sander, Eric K. "How Significant is a Baby's Babbling?" Elementary English, 1969, 46, 80-84.
- Shane, Harold G. and Mulrey, June G. Improving Language Arts Instruction Through Research. Washington, D. C.: Ass'n for Supervision and Curriculum Development, National Education Association, 1963.
- Strang, Ruth and Hocker, Mary Elsa. "First-Grade Children's Language Patterns." Elementary English, 1965, 42, 38-41.
- Strang, Ruth, McCullough, C. M. and Traxler, A. E. The Improvement of Reading, Fourth Edition. New York: McGraw-Hill Book Co. 1967.
- Strickland, Ruth G. "Reading in its Setting - the Language Arts." College English, 1959, Supplement.
- Strickland, Ruth G. "The Language of Elementary School Children: its Relationship to the Language of Reading Textbooks and to the Quality of Reading of Selected Children." Bulletin of the School of Education. Bloomington, Ind: Indiana Univ., 1962, 38 (4),
- Tagatz, G. E. "Grouping by Sex at the First and Second Grade." Journal of Educational Research, 1966, 59, 415-418.
- Templin, Mildred C. Certain Language Skills in Children: Their Development and Interrelationships. Univ. of Minnesota, 1957.
- Tripp-Ervin, Susan. "Language Development." in Hoffman and Hoffman (Eds.) Child Development Research II. Russell Sage Foundation, 1966, 55-107.
- Velten, H. V. "The Growth of Phonemic and Lexical Patterns in Infant Language." Language, 1943, 19, 281-292.
- Vernon, M. D. Backwardness in Reading. Cambridge Eng: Cambridge Univ. Press, 1957.
- Waetjen, Walter. "Research on Learning Levels of Symbolization Needed for Formalized Learning." in Rasmussen, M. (Ed.) Reading in the Kindergarten? Washington, D.C.: Assn. for Childhood Education International, 1962.
- Weintraub, S. "Sex Differences in Reading Achievement." The Reading Teacher, 1966, 20, 155-165.
- Weintraub, S. "Oral Language and Reading." Reading Teacher, 1968, 21, 769-773.

- Welch, R. P. "A Descriptive Study of the Language of a Selected Group of Young Children at the Beginning and End of a Four-Year Interval." Dissertation Abstracts, 1967, 27, 3766A.
- Wilt, Miriam. "Talk-Talk-Talk." Reading Teacher, 1968, 21, 611-617.
- Wozencraft, M. "A Comparison of the Reading Abilities of Boys and Girls at Two Grade Levels." Journal of the Reading Specialist, 1967, 6, 136-139.
- Wyatt, Nita. "The Reading Achievement of First Grade Boys Versus First Grade Girls." Reading Teacher, 1966, 19, 661-665.

APPENDICES

APPENDIX A

DESCRIPTION OF SUBJECTS

GIRLS INFORMATION SHEET

	C.A. (in months)	M.A. (in months)	I.Q.	Family Position	Pre-School Attendance		Socio-Econ. Status
					Kinder-garten	Play-school	
Cathy D.	75	101	125	* 1/3	X		2
Christie K.	70	97	127	2/3	X		1
Barbara M.	81	104	131	2/2		X	4
Evelyn R.	70	94	122	2/3		X	5
Lorie K.	71	94	122	1/2		X	1
Sheryl M.	80	95	111	3/4	X		5
Faye T.	71	95	119	6/7		X	5
Carol A.	75	87	101	1/3	-	-	2
Barbara C.	78	99	118	3/3		X	5
Wendy C.	74	84	100	1/2		X	4
Elaine C.	78	93	108	4/5		X	1
Mary Kay D.	69	69	86	4/5		X	1
Susan D.	77	95	114	1/2	X		1
Cathie A.	69	97	127	6/7		X	2
Tanis R.	69	90	114	1/4		X	5
Kathy M.	70	88	112	4/6	X		2
Patricia G.	72	84	100	7/8	-	-	6

* to be read, "first child of three"

BOYS INFORMATION SHEET

	C.A. (in months)	M.A. (in months)	I.Q.	Family Position	Pre-School Attendance		Socio-Econ Status
					Kinder-garten	Play-school	
Eric D.	73	101	129	* 2/4	X		1
Michael L.	69	88	112	1/1	X		5
Drew M.	74	87	103	2/2	X	X	4
Warren M.	81	95	111	4/5		X	5
Danny R.	76	101	125	2/2		X	4
Jim K.	77	95	114	6/6		X	3
Warren J.	72	88	106	3/3		X	3
Steven J.	77	90	105	1/1		X	2
Barry G.	79	93	108	1/1		X	3
David D.	69	87	109	4/5		X	5
Joe D.	75	90	106	2/2	X		1
David B.	71	89	107	4/4		X	2
Kenneth A.	75	79	90	3/3		X	4
Michael B.	73	78	93	1/2		X	5
Steven F.	69	80	101	1/2		X	3
Terry N.	72	83	99	2/2		X	6
Chris R.	74	101	129	2/3		X	2
John S.	80	89	100	1/1		X	5

* to be read, "second child of four"

APPENDIX B

TEMPLIN TEST OF ARTICULATION

Consonants:

/p/ pie---- open ---- soap ----
 /t/ toes ---- skating ---- bat ----
 /k/ cup ---- lucky ---- bat ----
 /b/ bed ---- robin ---- tub ----
 /d/ dish ---- wading ---- sled ----
 /g/ goat ---- biggest ---- flag ----
 /tʃ/ chip ---- reaching ---- peach ----
 /j/ jam ---- pigeon ---- page ----
 /f/ feet ---- coffee ---- knife ----
 /θ/ thin ---- plaything ---- bath ----
 /v/ vest ---- driving ---- stove ----
 /ð/ those ---- bathing ---- smooth ----
 /s/ see ---- myself ---- mouse ----
 /ʃ/ shop ---- washing ---- fish ----
 /z/ zipper ---- frozen ---- peas ----
 /ʒ/ measure ---- garage ---- (rouge)
 /m/ mat ---- coming ---- drum ----
 /n/ now ---- dinner ---- spoon ----
 /ŋ/ singing ---- laughing ----
 /l/ lamb ---- falling ---- bell ----
 /r/ ring ---- cherry ----

Consonants contd:

/w/ wet ---- blowing ----

/y/ yellow ---- onion ----

/h/ house ---- ship ahoy ----

Vowels and Diphthongs

/i/ bit ----

/e/ bet ----

/æ/ bat ----

/ə/ but ----

/a/ father ----

/ʊ/ put ----

/o/ whole ----

/ɔ/ log ----

/eh/ yeah ----

/ah/ calm ----

/ɔh/ dog ----

/ir/ mirror ----

/er/ merry ----

/æɪ/ marry ----

/ir/ bird ----

/ɔɪ/ hurry ----

/aɪ/ cart ----

/ʊɪ/ jury ----

/or/ story ----

/əɪ/ sorry ----

/iy/ beat ----

/ey/ bait ----

/ay/ bite ----

/oy/ boy ----

/uw/ boot ----

/aw/ bout ----

/ow/ boat ----

/ih/ idea ----

/æwɪ/ flour ----

/ihɪ/ dear ----

/uhɪ/ poor ----

/aɪɪ/ tire ----

BERKO TEST OF MORPHOLOGY

1. wug -----

10. naz -----

2. gutch -----

11. bik -----

3. spow -----

12. biks -----

4. kazh -----

13. zib -----

5. tiny wug -----

14. one who zibs -----

6. wug's house -----

Comments:

7. quirky -----

8. more quirky -----

9. most quirky -----

Compound Word Meanings:

football -----

sunshine -----

birthday -----

merry-go-round -----

Friday -----

blackboard -----

airplane -----

Comments:

BROWN AND BERKO TEST OF SYNTAX

Part I Word Association

(Count Noun)	1. table ---	7. house ---	13. apple ---
(Mass Noun)	2. milk ---	8. sand ---	14. water ---
(Adjective)	3. cold ---	9. white ---	15. sweet ---
(Transitive verb)	4. to find ---	10. to bring ---	16. to hit ---
(Adverb)	5. slowly ---	11. now ---	17. sadly ---
(Intransitive Verb)	6. to skate ---	12. to laugh ---	18. to come ---


Comments:

Part II Word Usage

(Mass Noun)	scop -----
(Transitive Verb)	roog -----
(Adjective)	hufty -----
(Count Noun)	a pilk -----
(Adverb)	boffily -----
(Intransitive Verb)	to stog -----

Comments:

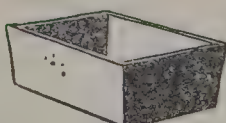
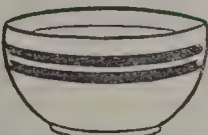

Type PPR. Paragraph Reading

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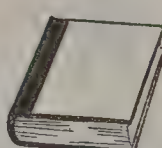
Write your name here.....

How old are you?.....When is your birthday?.....

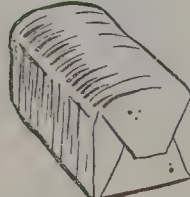


School.....Grade.....Date.....






1. Put an X on the ball.



3. Draw a line under the little book.



2. Put an X on the milk bottle.



4. Draw a line from the pig to the tree.



1. Put an X on the baby.



2. Put an X on the hat.



3. Draw a line under the big hen.



4. Draw a line under the black cat.



5. Put an X on the horse that is running a race.

3 8 8

6. Draw a line under the eight that is big.



7. Draw a line under the kitten that is playing with a mitten.



8. Put an X on the piece of white cake.



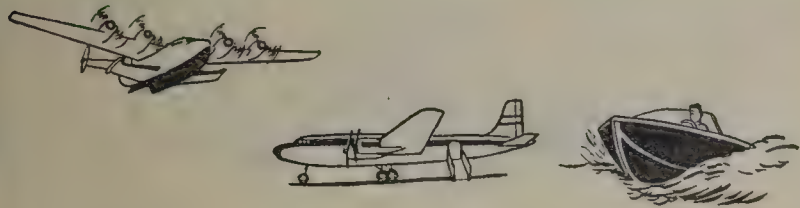
9. Put an X on the tree to which the robin is flying.



10. Draw a line under the doll on the chair.



11. Put an X on the boy who is fishing by the side of the brook.



12. One of these airplanes is in the air. Put an X on the one that is flying.



13. An elephant is bigger than a tiger, and a tiger is bigger than a monkey. Make an X on the elephant. It is the biggest.



14. The pony likes oats to eat. Draw a line from the pony to the oats.



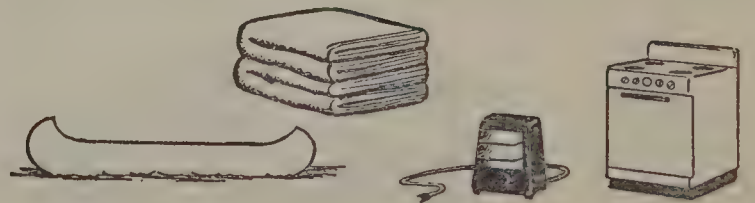
15. "Always brush your teeth after eating," said the teacher. Draw a line under the child who is doing what the teacher told him to do.



16. Every morning the children go to school. The bus stops for them at the corner. Draw a line under the thing in which they will ride.



17. Here are ten little Indians. Draw a line under the feet of five of these Indians.



18. When the children go to camp, they carry several blankets. Draw a line under what they always take to camp.



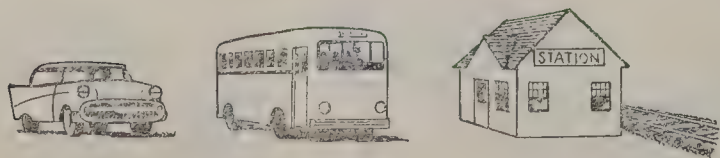
19. The children are waiting for grandfather. The train goes by them and comes to a stop. "There he is," they shout. Draw a line from him to the children.



20. A boy wanted to send a letter by air mail. The postman told him he must buy an air-mail stamp. Draw a line from the stamp to the boy who is going to use it.



21. The ladder is leaning against the burning building. One fireman is climbing up. Draw a line from him to the place where you see some fire and smoke.



22. In the morning Father leaves for the office. He walks to the station to take the train. Look for the station in the picture. Draw a line under it.



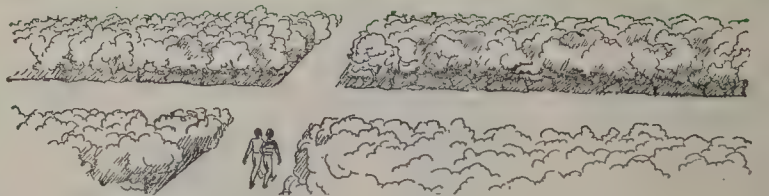
23. The bank is on School Lane between Wood Street and Oak Road. Put an X where the bank is.



24. A boy had gone fishing with his father. It was such fun to row out on the pond and fish. All of a sudden, the boy cried, "I have one, a big one!" and jerked at his line. Make an X on what the boy caught.



25. The race is about to begin. The boys are "ready" on their mark. They cannot start until the teacher blows the whistle. Put an X on what the teacher will blow.



26. A boy and his playmate were going to the woods. They were going to swim in the lake. Mother said, "Be sure to turn right at the crossing." Draw a line showing which way the boys should turn.

GATES PRIMARY READING TEST

TYPE PWR

For Grade 1 and Grade 2 (First Half)

FORM 3

Type PWR. Word Recognition



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Write your name here.....

How old are you?.....When is your birthday?.....

School.....Grade.....Date.....

1.



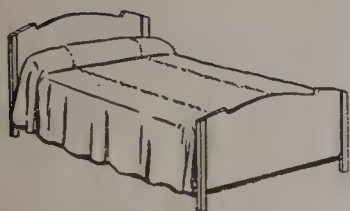
did

egg

dog

two

2.



be

bed

bag

she

3.



may

make

come

milk

4.



horse

play

hose

house

To the teacher: Detailed instructions for administering and scoring this test are given in the Manual (included in each test package).

Number correct.....

Number wrong.....

Raw score (correct minus $\frac{1}{3}$ wrong).....

Number tried.....(possible 48)

Reading grade.....

Reading age.....

Be sure to signal STOP at the end of 15 minutes.

Printed in U.S.A.

1.



leg

men

car

fly

2.



hid

six

pig

hat

3.



new

men

sled

ten

4.



boat

good

bowl

corn

5.



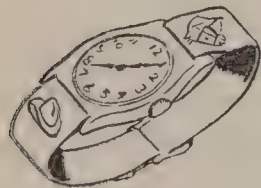
shoe

house

hour

mouse

6.



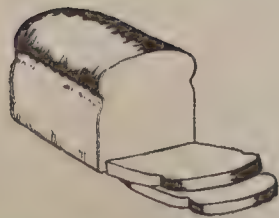
watch

water

night

house

7.



drink

green

broom

bread

8.



goes

drink

dress

blue

9.



clock

would

wolf

work

10.



boat

gone

goat

road

11.



fish

duck

town

dish

12.



cent

sing

six

sled

13.



mouse

great

pussy

grass

14.



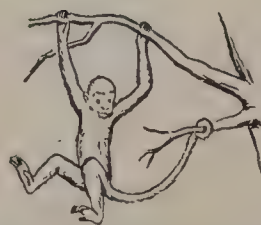
paper

sugar

paint

right

15.



mouse monkey

window money

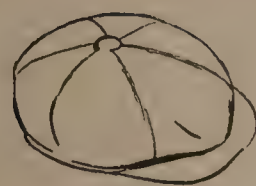
16.



splashing stocking

standing something

17.



ran cry
hop cap

18.



soon spring
spoon moon

19.



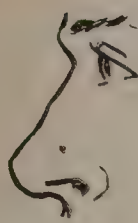
pussy pony
money puppy

20.



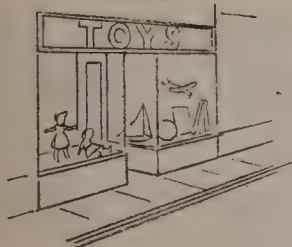
star moon
rope read

21.



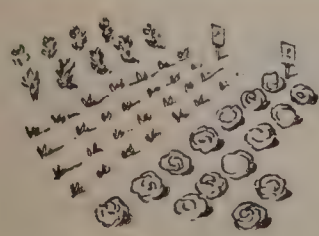
once nest
does nose

22.



stick stop
store shoe

23.



games garden
kitten gates

24.



bed pet
set not

25.



clothes clouds
others clover

26.



child think
dolls chick

27.



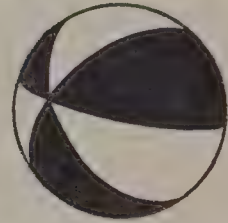
rock ride
rose rope

28.



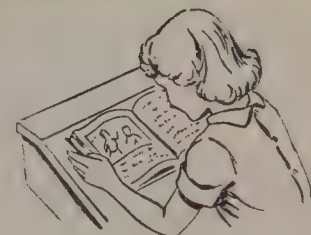
peanut piano
pupil pencil

29.



round room
road found

30.



riding reading
hiding raining

31.





minute kitten
mitten miller

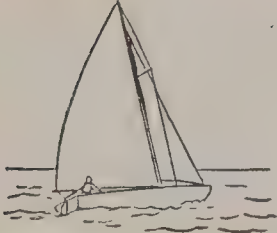
32.





goose goes
goody loose

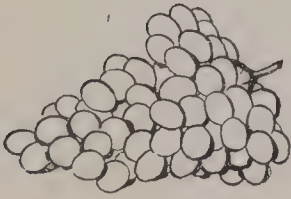
33.  pumpkin napkin
pumping punches


34.  needle nibble
needed handle

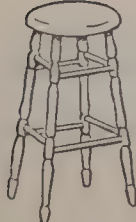
35.  nail salt
mail sail

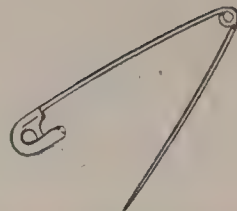
36.  geese cherries
cheese guess

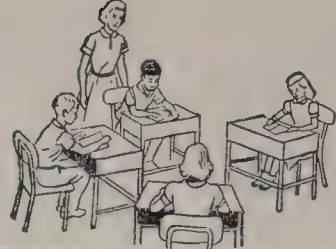
37.  card hard
cart care

38.  grass grapes
grind shape


39.  bow doll
cold bowl


40.  stool stood
stone tool

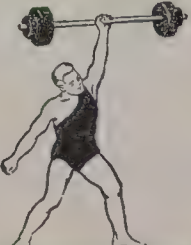
41.  pen pan
pin den

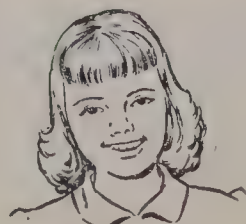
42.  grass close
cloth class


43.  donkey doctor
dollar double

44.  wing swim
swing smile

45.  bubble battle
bottle bottom

46.  stone stamp
strong string

47.  smoke smile
smell while

48.  branch bridge
brings hedge

APPENDIX C

PILOT STUDY

An Investigation into the Ability of First Grade Children
to Apply the Morphological Rules of English
to Unfamiliar Words

The use of tests to determine the extent of a child's productive control over the various systems that are operant within his language is gaining favor among those interested in the measurement of language maturity. One such test was devised by Jean Berko of Harvard University in 1958 to determine to what extent children in nursery school and first-grade could apply the morphological rules of English to form plurals, past tense, adjectives, etc. of words to which they had never had to apply these rules before. Her test consisted of 27 items involving nonsense words invented to be names of improbable animals or their actions. The children were required to apply the necessary rule to form the present and past tense, present participle, plural or possessive of these nonsense words. Certain items required the children to derive adjectives (including the comparative and superlative degrees), diminutives and compound words as well.

For the purposes of this analysis, ten of Berko's items were selected and presented to six first-grade children from a Public School in Edmonton, Alberta. The regular classroom teacher chose three good and three poor readers to be the subjects as the investigator was interested in the relationship between reading achievement and language maturity. Data concerning each child's chronological and mental ages, intelligence quotient, position in the family, and socio-economic status were obtained

from the cumulative records of the school. The ten test items along with seven familiar compound words which the children were asked to explain (also taken from the Berko test), were administered to each child individually. Responses to the ten test items were recorded on an answer sheet by the examiner in phonemic transcription; the children's explanations of why the compound words were so called were recorded on a tape recorder and transcribed later.

TABLE I

DATA OBTAINED FROM CUMULATIVE RECORD CARDS

Subject	C.A.	M.A.	I.Q.	Family Position	Soc/Ec. Level	Reading Group
A	6.5	8.2	129	2nd of 3	Prof.	High
B	6.9	8.8	135	3rd of 5	Prof.	High
C	6.7	7.6	109	1st of 2	Prof	High
D	6.11	7.0	96	2nd of 2	Skilled Worker	Low
E	6.9	*---	--	3rd of 5	Semi-Skilled	Low
F	6.7	6.7	94	(a twin) 3rd of 6	Civil Servant	Low

* Subject E is of Dutch parentage and an intelligence test was not given because of his language deficiency.

Analysis of Results of Tests

The ten items used yielded thirteen responses. Of these three were answered correctly by all of the children and two were answered correctly by none of them. The remaining eight responses were answered correctly more often by those in the high reading group than by those

in the low. An examination of Table II will show the results in detail, expressed in percentages.

The items answered correctly by everyone were those which required the child to form the plural by adding /z/ as in wug - wugs; the present participle by adding /ɪŋ/ as in zib - zibbing; and the singular possessive /s/ as in bik - bik's.

The items answered incorrectly by everyone were those which asked the child to derive the diminutive and the adjectival form from a noun, as wuglet from wug and quirky from quirk. There were three additional responses which were answered incorrectly by all of the poor readers. They asked the child to form the plural by adding /ɪz/, as gutch - gutches; to derive the agent of an action from the action word as a zibber is one who zibs; and to form the comparative degree of the adjective, as quirky - quirkier. All of the children in the high reading group were able to form the past tense of the verb by adding /d/, as in spow - spowed, whereas only one of the poor readers was able to do this. All the children in the low reading group were able to form the plural possessive of a noun, as biks-biks', whereas only two of the high reading group could.

TABLE II

ABILITY OF GOOD AND POOR READERS AND TOTAL GROUP
TO APPLY MORPHOLOGICAL RULES CORRECTLY
(EXPRESSED IN PERCENTAGES)

Morphological Rule	High Group	Low Group	Total Group
Plural by adding /z/	100	100	100
by adding /iz/	67	0	33
Past by adding /d/	100	33	67
Present by adding /iz/	67	33	50
Present Participle /inj/	100	100	100
Diminutive	0	0	0
Compound Word	67	33	50
Agent of Action	67	0	33
Possessive - singular /s/	100	100	100
plural /s/	67	100	83
Derived Adjective	0	0	0
Comparative of Adjective	33	0	17
Superlative of Adjective	67	33	50

TABLE III
INDIVIDUAL RESPONSES TO TEST ITEMS

Subject's Letter	Reading Group	Plural /iz/	Plural /z/	Past /d/	Present /iz/
A	High	*	*	*	*
B	High	*	*	*	*
C	High	x	*	*	x
D	Low	x	*	*	x
E	Low	x	*	-	x
F	Low	x	*	x	*
Totals		2	6	4	3

Pres. Part. /ing/	Diminutive	Compound	Adj. /y/	Comp. /ier/	Super. /iest/	Poss. 's,s'	Agent	Total
*	x	x	x	(x)	(x)	* *	x	7
*	x	*	x	x	*	* *	*	10
*	x	*	x	*	*	* x	*	8
*	x	*	x	(x)	(x)	* *	-	6
*	x	-	x	x	*	* *	x	5
*	x	x	x	X	x	* *	x	5
6	0	3	0	1	3	6 5	2	

Key: * - indicates mature adult response.

(x) - indicates alternate acceptable response

x - indicates unacceptable response

- indicates refusal or inability to respond

Analysis of Children's Explanations of Derivation of Compound Words:

The children were each asked to explain why they thought certain compound words were so called. The reason for asking was to find out if the children were aware that compound words were derived from two smaller words, each of which contributes in some way to the meaning of the compound. The children's responses were tape-recorded and later transcribed as shown in Table IV below.

TABLE IV
CHILDREN'S EXPLANATIONS OF DERIVATION OF COMPOUND WORDS

Sub- ject	Airplane	Football	Sunshine	Birthday	Black- Board	Merry- Go-Round	Friday
A	It flies in the air and it's a plane.	You kick it with your foot and it's a ball.	It shines and it shines from the sun.	It's the day you were born.	Don't know.	It is merry.	Don't know.
B	It's a plane that can go in the air.	You kick it with your foot.	The sun gives sunshine from the sun.	You were born on that day.	Because it's black	Children can ride on it and it goes around.	Don't know.
C	It flies in the air.	You kick it.	Because it shines.	It's the day they were born.	Don't know.	Don't know.	Because you fry on that day
D	You can fly in it.	You can kick it and it has points on it.	It can brighten up the world.	Because people can have birthdays.	You can draw on it.	You can ride while it is turning around.	Because that's a day.
E	Because it's an airplane.	Because it's a ball.	Because it's shiny.	Because it's a birthday.	Because it's a black-board	Because it's a merry-go-round	Because it's Friday.
F	Because it flies.	You play with it.	It makes light.	Because they have a birthday party.	You write on it.	Because it goes around.	Because it's a number.

These responses may be categorized into those that made reference to one of the two features of the compound word, those that made reference to both features, those that described the function of the compound word, those that merely repeated the word by means of explanation, those that introduced irrelevant ideas, and those that could not or would not answer. Table V shows how each subject's answers fitted into these categories while Table VI shows the distribution of the categories of answer among the various compound words.

TABLE V

SUBJECT RESPONSES CLASSIFIED ACCORDING TO CATEGORIES OF RESPONSE

Subject	One Feature	Two Features	Function	Repeat	Irrelevant	Refused
A	2	3	2	0	0	2
B	3	3	2	0	0	1
C	1	2	3	0	1	2
D	3	0	5	0	1	0
E	2	0	0	5	0	0
F	1	0	6	0	0	0

TABLE VI
DISTRIBUTION OF COMPOUND WORDS IN THE CATEGORIES OF RESPONSE

Category	Compound Words							
	Football	Sunshine	Birthday	Blackboard	Merry-Go-Round	Friday	Airplane	Total
One Feature	3	2	0	1	4	1	2	13
Two Features	1	2	3	0	0	1	1	8
Function	5	2	0	2	3	0	4	16
Repeat Word	0	0	2	1	1	1	1	6
Irrelevant	1	0	0	0	0	2	0	3
Refused	$\frac{0}{10}$	$\frac{0}{6}$	$\frac{0}{5}$	$\frac{2}{6}$	$\frac{1}{9}$	$\frac{2}{7}$	$\frac{0}{7}$	5

Examination of Table V shows that only the three children in the high reading group seemed to be aware that compound words are derived by combining two or more words whose meanings combine to make up at least part of the total meaning of the compound word. Description by reference to one of the components seemed to be used by all the children, but definition by function was used more often by the slow readers than by the good readers.

Analysis of Variables:

As there were only six children in this study no valid conclusions can be drawn, however certain trends can be noted which correspond to the conclusions which Berko formed from her study.

The variables in this study are chronological and mental age, intelligence, reading ability, family position and socio-economic status.

Chronological Age: The age range of this group was 6.5 to 6.11 years, with the mean age 6.7 years. A comparison between the youngest and oldest subject reveals very little difference in their abilities to perform on these tests. The youngest subject A scored 7 points on the test items while the oldest subject D scored 6, however A was one of the good readers with a high IQ and D was a poor reader with a low IQ. Also there was only six months difference in their ages, which may not be enough to show significant differences.

Mental Age: The mental ages given were obtained in September at the time of intelligence testing and, as seven months had elapsed, these were not considered applicable and so no analysis was done.

Intelligence: The IQ range was from 94 to 135 with a mean of 112. Those children with high IQ were also in the high reading group so these two variables tended to merge. One child in the low reading group had not been given an intelligence test because of his foreign language background.

The three children of high intelligence and in the good reading group did better in this investigation than did the other three children whose IQ was below 100 and were in the poor reading group. This former group answered more of the test items in a mature adult manner as well as being more aware of the derivation of compound words. These same three children were also in the highest socio-economic group according to their fathers' occupations so this variable tended to merge with IQ and reading ability so that the better performance of these children in this study could not be related to any of these three variables in

isolation.

Family Position: Research has shown that the position that the child occupies in the family by virtue of birth order affects the manner in which his language develops. First-born children have been found to develop mature language ability faster than subsequent children and that twins develop this ability slowest of all. In this study there was one child who was first-born and one twin who was third or fourth in his family. A comparison of these two children's performance on these tests indicates that the first-born C did better than the twin F. C's score was 8 mature adult responses as compared with F's 5 mature adult responses. C used two features in his explanation of the compound words twice while F did not use two features at all.

Conclusions: Brief though this study was, it did show that children differ in their levels of language maturity and that those with high IQ, high socio-economic status are able to talk and read better than those who are not so fortunate. A similar study using many more children might be able to differentiate among the variables of intelligence, reading ability and socio-economic status in such a way that the direct relationships among these might be observed. Only then could any worthwhile knowledge be gained that might lead us closer to understanding the role of language development in the child's ability to learn to read.

APPENDIX D

SCORES ON LANGUAGE AND READING TESTS

Girls' Language Scores

	Articulation		Morphology		Syntax		Total Language
	Raw Score	Percent	Raw Score	Percent	Raw Score	Percent	Percent
Cathy D.	100	100	10	38.46	4	16.66	51.71
Christie K	100	100	14	53.90	6	25.00	59.63
Barbara M.	85	85	15	57.75	3	12.50	51.75
Evelyn R.	100	100	8	30.76	4	16.66	49.14
Lore K.	100	100	14	53.90	11	45.84	66.58
Sheryl M.	99	99	10	38.46	12	50.00	62.49
Faye T.	100	100	12	46.16	7	29.16	58.44
Carol A	95	95	16	61.60	11	45.84	67.48
Barbara C.	98	98	15	57.75	7	29.16	61.64
Wendy C.	99	99	5	19.23	5	20.83	46.35
Elaine C.	100	100	7	26.91	0	00.00	42.30
Mary Kay D.	99	99	18	69.30	6	25.00	64.43
Susan D.	99	99	16	61.60	14	58.34	72.98
Cathie H.	98	98	15	57.75	6	25.00	60.25
Tanis K.	99	99	4	15.38	4	16.66	43.68
Kathy M.	96	96	9	34.61	6	25.00	51.87
Patricia G.	98	98	6	23.08	6	25.00	48.69

Boys' Language Scores

	Articulation		Morphology		Syntax		Total Language
	Raw Score	Percent	Raw Score	Percent	Raw Score	Percent	Percent
Eric D.	83	83	14	53.90	12	50.00	62.30
Michael L.	98	98	12	46.16	5	20.83	55.00
Drew M.	87	87	7	26.91	5	20.83	44.91
Warren M.	98	98	11	42.31	8	33.33	57.88
Danny R.	98	98	10	38.46	10	41.68	59.38
Jim K.	99	99	15	57.75	6	25.00	57.25
Warren J.	100	100	18	69.30	11	45.84	71.71
Steven J.	97	97	9	34.61	5	20.83	50.81
Barry G.	100	100	11	42.31	11	45.84	62.72
David D.	98	98	12	46.16	8	33.33	59.16
Joe D.	99	99	14	53.90	7	29.16	60.69
David B.	86	86	9	34.61	9	37.51	52.71
Kenneth A.	97	97	15	57.95	11	45.84	66.86
Michael B.	94	94	5	19.23	5	20.83	44.69
Steven F.	98	98	13	50.00	12	50.00	66.00
Terry N.	97	97	13	50.00	8	33.33	60.11
Chris R.	99	99	20	76.92	15	60.51	78.81
John S.	98	98	9	34.61	11	45.84	59.48

Girls' Reading Scores (Raw)

	Gates Primary Paragraph Reading	Gates Primary Word Recognition	Total
Cathy D.	25	48	73
Christie K.	25	48	73
Barbara M.	25	45	70
Evelyn R.	20	40	60
Lore K.	24	48	72
Sheryl M.	20	40	60
Faye T.	18	40	58
Carol A.	14	36	50
Barbara C.	23	43	66
Wendy C.	14	33	47
Elaine C.	11	34	45
Mary Kay D.	12	36	48
Susan D.	25	48	73
Cathie H.	25	45	70
Tanis K.	17	28	45
Kathy M.	19	39	58
Patricia G.	16	36	52

Boys' Reading Scores (Raw)

	Gates Primary Paragraph Reading	Gates Primary Word Recognition	Total
Eric D.	24	48	72
Michael L.	19	27	46
Drew M.	19	35	54
Warren M.	19	38	57
Danny R.	12	40	52
Jim K.	22	48	70
Warren J.	11	39	50
Steven J.	11	36	47
Barry G.	14	39	53
David D.	22	39	61
Joe D.	17	33	51
David B.	13	25	38
Kenneth A.	14	35	49
Michael B.	10	9	19
Steven F.	10	13	23
Terry N.	14	34	48
Chris R.	25	47	72
John R.	15	31	46

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